Loan and financing diversification and bank stability in dual-banking systems

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ARTICLE INFO	ABSTRACT
	Our investigation of 46 conventional and 22 Islamic banks from the Gulf Cooperation Council (GCC) countries during 2008–2021 reveals that sectoral diversification effects on stability are nonlinear and different for the two bank types. While Islamic banks' stability is worsened only by moderate levels of diversification, conventional banks' stability is enhanced by high levels and impaired by low levels of diversification. Furthermore, diversification acted as a stabilizer during the global financial crisis but exacerbated the adverse effects of the Covid-19 pandemic. Although regulators usually call for bank diversification, our results imply that it can be a double-edged sword.

1. Introduction

Due to dependence on oil and gas revenue and their price plunge caused by the Global Financial Crisis (GFC) in 2008, the governments of the Gulf Cooperation Council (GCC) countries started introducing various policies aiming at developing diversified real and financial sectors.[1] While oil and gas production still represents over 40% of the GDP in GCC countries, with the exception of Bahrain and UAE, (Esam, 2021) shows that there has been significant diversification away from hydrocarbon revenue since 2010 in all GCC countries, particularly in Saudi Arabia, UAE and Bahrain. Given the low development of capital markets and non-bank financial institutions in these countries, banks play a pivotal role in assisting the execution of these national diversification policies by providing financing to support investments in the existing and 'new' sectors. The proponents of diversification in banking would see this as an opportunity for banks to spread their loans and financing[2] across different sectors and thus reduce bank default, liquidity, and bankruptcy risks (Diamond, 1984; Demsetz and Strahan, 1997; Rose and Hudgins, 2006), vulnerability to economic downturns and

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[1] Examples include Saudi Arabia's "The Vision 2030 program", "Abu Dhabi Economic Vision 2030" "Oman Vision 2040", all of which aim to bring a series of reforms and transformations to their economies.

[2] At this juncture, it is important to explain how financing is different from loans. Financing is the core activity of Islamic banks and in our paper refers to the balance sheet line item *"financings and advances"*. From an accounting viewpoint, this is an equivalent of the conventional bank *"loans and advances"*. However, the nature and structure of the two are different as the former has to be attached to a real asset or economic activity, while the latter is debt-based.

financial crises (Tabak et al., 2011; Doumpos et al., 2016), and become safer and more stable (Saunders and Walter, 2012). On the contrary, the opponents of diversification would argue that banks are better off by focusing on a single sector or a few sectors as that allows them to leverage their screening and monitoring knowledge and expertise in these sectors and thus reduce the unnecessary complexity, agency problems, overhead expenses (Klein and Saidenberg, 2010), earnings volatility (DeYoung and Roland, 2001), and write-downs and write-offs (Jahn et al., 2013) that usually come with diversification.

A considerable amount of empirical literature has tested the above arguments, mainly focusing on conventional banks from developed economies and emerging markets. While offering significant insights, the controversy remains. To our knowledge, the impact of loans and financing diversification in the context of GCC banks has been investigated only by (Al-kayed and Aliani, 2020; Šeho et al., 2021). However, both papers focus on the impact of diversification on bank risk and returns, not on stability. (Al-kayed and Aliani, 2020) showed that sectoral diversification improves profitability while worsening the risk of Islamic banks in the GCC during 2010–2018. Similarly, (Šeho et al., 2021) found that sectoral diversification is unfavorable for both conventional and Islamic banks' risk-return profiles in both the GCC and Malaysia during 2000–2015. While there are some studies examining diversification impacts on bank stability in the GCC (or the GCC being part of a larger sample), such as (Abuzayed et al., 2018; AlKhouri, 2019; Azmi et al., 2019; Maghyereh and Yamani, 2022; Paltrinieri et al., 2020), they use income (also known as revenue or activity) diversification, not sectoral.

To bridge this knowledge gap, we examine the following research questions: (i) Does sectoral diversification of loans and financing affect the stability of banks in the GCC countries? (ii) Are the effects, if any, the same or different on conventional and Islamic banks? (iii) Does loan and financing diversification help GCC banks sail smoother through economic downturns such as the 2008 global financial crisis and the ongoing Covid-19 pandemic? Our study employs a unique sample of conventional and Islamic banks from the GCC during an eventful period (2008–2021) marked by the introduction and implementation of national diversification policies and two adverse events, namely the GFC at the beginning and the Covid-19 pandemic at the end. The GCC banks are an interesting case as they are the primary conduit for financing the national economic diversification plans. Additionally, these countries are home to dual-banking systems where two intrinsically different bank types operate and compete. While there are other dual-banking countries, their inclusion would make it challenging to account for country-specific heterogeneities given their differences in terms of economic structure and political, cultural, and regulatory environments. Additionally, Islamic banking is still far from being harmonized across different jurisdictions. These six GCC countries are similar in all the above, which motivates us to focus on them.

Our work contributes to the bank diversification-stability nexus literature in at least three ways. First, we extend the empirical literature by examining different types of banks from unique dual-banking countries that, to the best of our knowledge, have not been studied thus far. Second, our methodological approach is different from most previous studies. We demonstrate that it is crucial to account for nonlinear relationships and not assume that they are statistically significant along the entire 'nonlinear curve'. Indeed, our estimates confirm that and offer more insightful and granular findings that would otherwise be regressed to the mean and misleadingly generalized. Third, we contribute to the literature on bank diversification-stability nexus during economic downturns by investigating the diversification effects during the GFC 2008 and the Covid-19 pandemic.

Our findings suggest that there is no one-strategy-fits-all concerning diversification of loans and financing across economic sectors, even within these comparable countries. High levels of diversification improve the stability of conventional banks, while low levels hurt them. For Islamic banks, only moderate levels of diversification have a destabilizing effect. Furthermore, diversification enhanced bank stability during the global financial crisis but weakened it during the Covid-19 pandemic.

2. Data and methodology

Our data is an unbalanced panel that comprises 46 conventional and 22 Islamic banks from the GCC spanning 2008–2021. We include only banks with at least three years of consecutive observations. Observation breakdown per year, country, and bank type is presented in Table 1. All continuous bank-specific variables are winsorized at the 1st and 99th percentile to remove the outliers' potential extreme influence on the statistical results.

To address our research questions, we employ a dynamic model. This is sensible as most economic behaviors are dynamic, and hence "*most econometrically interesting relationships are explicitly or implicitly dynamic*" (Nerlove, 2005). Our baseline model is:

$$Z - score_{bt} = \beta_0 Z - score_{bt-1} + \beta_1 DIV_{bt-1} + \beta_2 DIV_{bt-1}^2 + \beta_3 B_{bt-1} + \beta_4 C_t + \tau_t + \nu_b + \varepsilon_{bt} \tag{1}$$

Where $Z\text{-}score_{bt}$ is a log of Z-score of bank b at time t that measures a bank's stability; DIV_{bt-1} is the sectoral loan and financing diversification measure of bank b at time $t\text{-}1$; B_{bt-1} is a vector of bank-specific variables at time $t\text{-}1$; C_t is a vector of country-specific variables at time t; τ_t is a time-specific effect; ν_b is a bank-specific time-invariant effect and ε_{bt} is the common error term. We also include the square term of diversification (DIV_{bt-1}^2) to capture a possible nonlinear relationship between bank diversification and stability.

Like previous studies, we employ the log of the Z-score to take care of the highly skewed Z-score across our sample. Henceforth, we use "Z-score" to refer to the logged Z-score for brevity. We examine the diversification effects in year $t\text{-}1$ on Z-score to account for the potential delay in monitoring-related effects as suggested by (Acharya et al., 2006). The additional benefit of this approach is that it partially addresses the possible endogeneity problem of our diversification measure. We use the Adjusted Herfindahl-Hirschman Index (AHHI) to measure DIV_{bt-1}, which captures the dispersion of loans and financing among economic sectors in a country. Though AHHI is one of the most commonly used diversification/concentration measures, it is not free of limitations. Its primary disadvantage is that it cannot capture the complexities of various market dynamics. For instance, it does not capture the extent to which sectors depend on

each other, which would be important as the oil and gas sector may drive other sectors. Also, the HHI is limited by the available data and the disaggregation degree of loans and financing per economic sector (Chikoto et al., 2016). Bank-specific and country-specific control variables and their definitions are explained in Table 2.

Since our sample countries are dual-banking systems where inherently different Islamic and conventional banks operate and compete side-by-side, we test if the above effects differ for the two bank types. To distinguish between the two, we modify Eq. (1) by interacting the Islamic bank dummy variable IB_b with the diversification variable (DIV_{bt-1}).

$$Z - score_{bt} = \beta_0 Z - score_{bt-1} + \beta_1 DIV_{bt-1} + \beta_2 (DIV_{bt-1} \times IB_b) + \beta_3 DIV_{bt-1}^2 + \beta_4 (DIV_{bt-1}^2 \times IB_b)$$
$$+ \beta_5 IB_b + \beta_6 B_{bt-1} + \beta_7 C_t + \tau_t + \nu_b + \varepsilon_{bt} \tag{2}$$

Given our dynamic models and an unbalanced panel with relatively few periods (T) and large cross-sections (N), the Generalized Method of Moments (GMM) appears to be the most suitable to estimate Eqs. (1) and (2). Using the traditional panel estimators would be statistically inadequate due to a potential correlation between the individual-fixed effects and lagged dependent variable that may result in biased coefficients (Nickell, 1981). Due to a lack of precision and potential biasedness of the difference GMM (Blundell and Bond, 1998), we choose the two-step system GMM proposed by (Blundell and Bond, 1998) and (Arellano and Bover, 1995), which can take care of these issues. We apply the (Windmeijer, 2005) correction to make the two-step standard errors more robust. To validate our estimations, we run the Hansen test of over-identification and Arellano and Bond tests of autocorrelation of orders 1 and 2 in the differenced residuals.

3. Empirical findings

3.1. Basic results

Table 3 presents the descriptive statistics of our variables, and Figure 1 plots the trends of the annual mean values of the Z-score and diversification. On average, conventional banks are more stable. The Z-score difference between the two bank types stems mainly from the standard deviation of the returns on assets, implying that Islamic banks' returns are more volatile. While Islamic banks have maintained almost the same level of stability throughout the period, conventional banks have significantly improved theirs from 2008 to 2011. However, their Z-score plummeted during the Covid-19 pandemic, while Islamic banks' Z-score has not changed much. Conventional banks are also, on average, more diversified. This is not surprising given the restrictions on Islamic banks' financing of Islamically non-permissible activities.

A necessary condition for diversification benefits is that the sectors are not perfectly positively correlated. Table 4 shows the correlation matrix of the sectors per country and reveals that the correlation between sectors in all countries is nowhere near perfectly positive. In fact, some sectors are negatively correlated, suggesting that there are potential diversification benefits for banks if they calibrate their loan and financing portfolio optimally.

Table 5 presents the regression estimations of Eqs. (1) and (2). The high statistically significant lagged dependent variable co-efficients confirm the existence of the dynamics of the Z-score and a great extent of its persistence, which supports our choice of the dynamic model. The post-estimation specification tests, i.e., Hansen and AR(1)/AR(2) tests, confirm the validity of our estimates.

Analysis of the overall sample (regression 1) does not show any significant impact of diversification on bank stability. Similarly, simply distinguishing between Islamic and conventional banks by a dummy variable (regression 2) does not paint a different picture from the overall sample. However, testing for potential nonlinear effects (regression 3) produces insightful results. Figure 2 reveals that diversification hurts the stability of less diversified (below 0.45 of AHHI) conventional banks and improves the stability of well-diversified (above 0.67 of AHHI) ones. Islamic banks' stability is adversely affected only by moderate levels of diversification (0.33 to 0.55 of AHHI).

Considering that our loan and financing diversification measure is also an inverse measure of loan and financing concentration across sectors, the opposite interpretation of the results holds true (see Figure 3). Conventional banks with highly concentrated loans can enhance their stability by concentrating their loans even more. Similarly, Islamic banks' stability appears to benefit from moderate levels of financing concentration.

The control variables reveal that stability is positively associated with bank size, liquidity, and foreign ownership, while negatively related to non-interest (non-financing) income[3] share, growth of loans, and inflation.

Table 6 reveals that our results have a temporal dimension. During the global financial crisis in 2008,[4] diversification positively impacted bank stability. However, during the Covid-19 pandemic,[5] diversification amplified the adverse effects on stability.

3.2. Robustness check

We test if our primary results are robust to an alternative diversification measure. Following (Tabak et al., 2011) and (Behr et al.,

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[3] Please note that non-financing income is the Islamic banks' equivalent of non-interest income in conventional banks. In both cases, these are income generated from sources other than lending/financing. Please see footnote 1 for the difference between the two.

[4] Following (Abuzayed et al., 2018), we take 2008-2009 as the crisis period, although the GFC appears to have had only a moderate impact on bank behavior in the GCC.

[5] We use 2020 and 2021 as the pandemic years.

2007) we use the Shannon Entropy, also known as Shannon's Diversity Index. According to (Behr et al., 2007), this measure is powerful in indicating variety in distributions at a given time. However, we acknowledge that, just like AHHI, it cannot capture all the complexities of the loan and financing market. The results are presented in Table 7 and Figure 4. By and large, our primary conclusions remain the same.

4. Discussion and conclusion

Against the backdrop of the GCC countries' ongoing economic diversification policies and banks being the primary financiers of the projects brought about by these policies, we investigate (i) if and how diversification of loans and financing across economic sectors impacts the stability of GCC banks, (ii) if the effects are the same on conventional and Islamic banks, and (iii) if diversification helps banks navigate smoothly through economic downturns such as the 2008 global financial crisis and the ongoing Covid-19 pandemic.

Analyzing a unique panel dataset of 46 conventional and 22 Islamic banks, we find that there is no one-strategy-fits-all even within these seemingly similar countries. Diversification effects on bank stability are nonlinear and different for Islamic and conventional banks. While Islamic banks' stability worsens at moderate levels of diversification, conventional banks' stability thrives at high levels and erodes at low levels of diversification. Given that the diversification measure is an inverse measure of concentration, this means that a high concentration of loans on one or a few economic sectors also benefits conventional banks. Lastly, we observe a temporal dimension of our results which suggests that diversification supported bank stability against the destabilizing effects of the global financial crisis but amplified the adverse effects of the Covid-19 pandemic.

Our findings offer significant implications for bank managers and their regulators. First, conventional bank managers are advised to either diversify or focus their loan portfolio as much as possible to enhance their bank stability. Staying in-between or moving from one strategy to the other comes at the expense of stability. On the other hand, Islamic bank managers would benefit from a focused financing strategy. Second, regulators, policymakers, and standard-setting bodies should not blanketly call for bank diversification. Providing some leeway to banks with close monitoring could yield better bank stability. This is especially important in the wake of ambitious national economic diversification policies.

Author statement

We, the undersigned, declare that the manuscript "*Loan and financing diversification and bank stability in dual-banking systems*" is *original, has not been published before, and is not currently being considered for publication elsewhere.*

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that all have approved the order of authors listed in the manuscript of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He is responsible for communicating with the other authors about progress, submissions of revisions, and final approval of proofs.

Declarations of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Data will be made available on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2022.103395.

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