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Article

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Market power and the role of banks as liquidity providers in GCC markets

Ritab Al-Khouri^{1*} and Houda Arouri¹

Abstract: Purpose: The study aims to discuss the role of market power and the banks as a liquidity provider, specifically in the twenty-first century.

Design: The empirical investigation has evaluated the effects of market power on the ability of GCC banks to provide and transform liquidity.

Findings: The banks conveniently perform two significant functions as the financial institution; therefore, they are known to play the role of risk transformers. They have been recognized as the important entities of liquidity creators and providers. The increase in market power increases the ability of GCC banks to create liquidity. There is a negative association between Inflation, growth in GDP, and ability of bank to produce liquidity.

Conclusion: The financing impediments are reinforced due to increased competition among different banks. The demand of loans is likely to increase, when the investors possess valuable investment projects during expansion. The study recommends that the future research must involve off-balance-sheet items in the investigation for further clarification.

Subjects: Finance; Financial Crisis; Financial Economics; Financial Intermediation; Financial Markets;



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Ritab Al-Khouri is a full professor of Finance at the Department of Finance and Economics/Qatar University. Holds a Ph.D from the University of Wisconsin at Madison. Her research interests include corporate governance, risk management, portfolio selection, agency issues, earning management, financial systems, and capital structure. Houda Arouri She is a lecturer of Finance at the Department of Finance and Economics/Qatar University since 2012. Before joining College of Business and Economics, Houda served as Head of Investment section in Finance Department at Qatar University. She completed her PhD at FSEG's university in Tunisia. Her research interests include, asset pricing, credit ratings, liquidity crisis, financial distress, corporate governance, bank performance, and macroeconomic risk factors. This research is part of a series of papers directed toward studying the performance, stability, diversification, asset management and liquidity of the banking sector in the GCC Countries.

PUBLIC INTEREST STATEMENT

The study aims to discuss the role of market power and the banks' effects of market power on the ability of GCC banks to provide and transform liquidity. The analysis in this study has been conducted by evaluating the annual data on bank variables from the Gulf database including their annual reports. The study is helpful for the financial, banking, and economic professionals because of its relevance with the field. There are positive and effective shifts in the resources because of liquidity creation by the banks. The shift primarily occurs from savings to investments due to the undertaking of short-term liquid liabilities in the form of deposits and creating long-term illiquid credits. The increase in market power increases the ability of GCC banks to create liquidity. Inflation, growth in GDP, and ability of bank to produce liquidity are negatively associated. The study further recommends that future research must involve off-balance-sheet items in the investigation.

| **Keywords:** Bank; liquidity; Gulf Cooperation Council (GCC); loans; market power

1. Introduction

There are positive and effective shifts in the resources as a result of liquidity creation by the banks. The shift primarily occurs from savings to investments due to the undertaking of short-term liquid liabilities in the form of deposits and creation of long-term illiquid credits. This shift performs an important function to facilitate production activities and enable efficient consumption (Levine, 1991). The stock markets accelerate growth by allowing the investors to rely on the diversified portfolios and facilitate trade ownership of different organizations without damaging the productive processes. The leverages of restrictions on entry by branches of foreign banks increased liberalization and market openness in Gulf Cooperation Council (GCC). It raised the question about the role of market power in banking sector and its effects on liquidity, provided by banks for the economy.

Liquidity creation plays an important role in commercial banks being a critical financial factor within the economy. It also plays an important role in the establishment of macro-economy by encouraging the production of goods and spur economic growth of the country. It is also possible that banks fail while creating high amounts of liquidity on the balance sheet within a specific time period. This might result in drying up of the liquidity with adverse consequences for the country's economy (Tu, 2015). The substantial creation of liquidity by the banks leads to pursue the leading policies, which increases fragility of the banking sector.

Banks, as financial institutions, conventionally perform two important functions in any economy, which include liquidity creators and providers and risk transformers (Diamond & Dybvig, 2000). The banks facilitate production, investments, and support in economic growth through the transformation in liquidity. Banking sector liquidity is directly associated with the security of fund availability and accessibility of financial resources. Banks can meet their commitments if they are able to borrow or if their assets are quickly transformed into cash with minimum or no losses. However, banks' capital structure might be fragile due to the divergence between banks' assets and liabilities.

The banks are able to address liquidity distresses by lending and borrowing from their financial reserves, when that are in excess; thereby increasing the inefficiency of these banks. Therefore, it is claimed that the central bank can reduce these imperfections (Allen & Gale, 2004; Bhattacharya & Fulghieri, 1994). The effects of regulatory-induced competition on banks' risk taking, efficiency, and valuations are assessed by Goetz, Laeven, and Levine (2016). Risks are linked with illiquidity, which might increase due to the differences between cash flow that comes from principal and interest associated with assets, liabilities, and off-balance-sheet. The main reason for the fragility of banks is their functions in transforming maturity and offering protection with respect to creditors' expected needs for liquidity (Diamond & Dybvig, 2000).

The literature has cited two contrary views concerning the effects of banks' market power on their capacity to create liquidity. The first view is related to the fact that increased competition (i.e. low market power) might reduce bank profitability, leading to an increase in bank fragility (Jimenez, Lopez, & Saurina, 2013). The solvency of particular institutions threatened by the standard principle of banking supervision allows excessive competition among the banks. Therefore, banks would try to limit the amount of credit granted and reduce the volume of deposits accepted that would reduce the liquidity created by banks. The second view suggested that high competition or low market power would lead to a reduction in loan rates and an increase in deposit rates, which increases the demand for loans and deposits (Boot & Thakor, 2000). In this scenario, small banks appear to provide no significant buffer to the investments (Kashyap & Stein, 1995). Therefore, bank liquidity creation is expected to increase through the bank pricing channel (Love & Peria, 2015).

Endogeneity can occur when there is reverse causality, since the market power and liquidity are jointly determined. It is possible that banks with high market power provide more liquidity to the

market or to other banks in need of liquidity. In this situation, banks can achieve higher market power. On the other hand, banks with high liquidity have the chance to expand or merge with other banks, leading to increased market power. Davidson and MacKinnon (1993) suggested that test is done for endogeneity using an augmented regression Durbin Wu-Hausman test.

The banking sectors of GCC countries are domestically owned by providing financial leniencies to the foreign banks. Such banks are usually not allowed to enter the GCC market; however, they are allowed to open a restricted number of branches. The development of financial markets is the primary aim of the Gulf countries. Moreover, the economic conditions in GCC markets are resilient corresponding to the global financial crisis. The financial developments suffer because of low market liquidity, funding issues, and large price swings. Therefore, the present study has discussed the role of market power and the banks as a liquidity provider in the twenty-first century. It empirically investigates the effects of market power on the ability of GCC banks to provide and transform liquidity. The study has conducted the analysis by evaluating the annual data on bank variables from the Gulf database including the annual reports of 69 Islamic and conventional banks established in 6 GCC countries. Table 1 has shown the percentage of foreign banks to total number of banks in the sample. It further shows the concentration of the banking industry in the GCC.

2. Materials and methods

2.1. Data source

The study has included annual data on bank variables taken from Gulf Base database, and the annual reports of 69 conventional and Islamic banks located in six GCC countries during the 2002–2014 period. The database offered complete information for the years 2002 till 2014. Therefore, the banks having complete data available for these years were included in the study. Data were collected on macro-economic variables as the growth in real GDP and inflation obtained from the World Development Indicators (WDI). The stock market capitalization data were taken from Gulf-Base database.

The present study has used the two-step Generalized Method of Moments (GMM) to evaluate and compare the outcomes of the coefficient vectors from two models, similar to Arellano and Bond (1991). Among the two models, one treats market power as endogenous; while, the other treats market power as exogenous. The GMM methodology reduces the problem of endogeneity between variables. The GMM optimally assisted in dealing with the dependent and independent variables (Arellano & Bond, 1991).

2.2. Hypothesis Development

H1: Increase in market power affect the ability of GCC banks to create liquidity.

H0: Increase in market power does not affect the ability of GCC banks to create liquidity.

Table 1. Characteristics of banks in the GCC

Countries	Top 3 banks	Government ownership	F	No. of domestic banks (%)	No. of conventional banks	No. of Islamic banks
Bahrain	71.27%	1.37%	22.61%	48 (13)	7	6
Kuwait	67.84%	12.17%	2.31%	10 (10)	8	2
Oman	77.31%	5.45%	11.62%	9 (7)	5	2
Qatar	72.92%	21.75%	0.00%	11 (8)	7	1
Saudi Arabia	46.04%	13.43%	11.04%	12 (12)	6	6
UAE.	53.12%	19.25%	8.69%	21 (19)	15	4

Source: author's calculations and country authorities.

H2: Increase in competition among the banks decreases their ability to provide liquidity.

H0: Increase in competition among the banks increases their ability to provide liquidity.

2.3. Research methodology

The impact of market power and competition variables on GCC banks were evaluated to analyse liquidity of banks through certain attributes and macro-economic indicators. The model was evaluated as

$$Liq_{i,j,t} = f(MP_{i,j,t}, BS_{i,j,t}, ME_{j,t}) \quad (1)$$

where

$Liq_{i,j,t}$ measures of liquidity creation of bank i , in country j and time t .

$MP_{i,j,t}$ is the proxy for market power of bank i , in country j and time t .

$BS_{i,j,t}$ reflects a vector of bank i specific characteristics, in country j and time t .

$ME_{j,t}$ is a vector of macroeconomic variables for each single country, over time t .

The study has used cross-sectional and time series data to obtain information on liquidity created by the banking system over time. The component of time in a dynamic panel is expected to assess the consequences of continuous changes in institutional characteristics on bank liquidity creation. Therefore, the dynamic model to be implemented suggests that the current level of liquidity will eventually be affected by past liquidity levels. The equation takes the following form:

$$LIQ_{ijt} = \alpha_0 + \beta_1 BS_{ijt} + \beta_2 ME_{ijt} + v_{ijt} \quad (2)$$
$$v_{ijt} = \epsilon_i + \mu_t + \rho_{ijt}$$

where

LIQ_{ijt} is the Liquidity creation measure (i.e., dependent variable) for bank i in country j and at time t .

BS_{ijt} is a vector of specific characteristics of bank i , in country j and at time t .

ME_{ijt} refers to the vector of macro-economic and financial structure indicators of country j , and time t .

β_1 and β_2 are vectors of coefficients estimated.

v_{ijt} is an error-term.

2.4. Liquidity creation variable (LIQ)

Liquidity creation was measured as the difference between liquid assets and liquid liabilities, divided by total bank assets. A higher value indicated a better ability of a bank to create liquidity. The definition of liquidity creation implemented revealed the liquidity of assets and liabilities of the banks' balance sheet. The study concentrated on the following measure:

$$LIQ = (\text{Liquid liability} - \text{Liquid Assets}) / \text{Gross total assets}$$

The measure of liquid liability included all entries in the balance sheets that have maturity of one year or less. In addition to money market deposits, demand deposits, foreign deposits, and any other borrowed resources were included that have a maturity of one year or less. The measures of

liquid assets include cash, acceptances (either governmental or non-governmental securities), and loans that have a maturity not exceeding one year.

2.5. Market power (MP)

Herfindahl-Hirschman index (HHI) is a measure of concentration, which is calculated as the sum of squared market share of each bank in the system used to measure concentration in the theoretical literature. The HHI, as the concentration ratio, ignores the importance of smaller banks in the industry. More concentration is placed on the Boone index, instead of using the concentration measures for market power. Boone index provides a direct measure of market power based on the recent empirical literature related to industrial organization. The study has attempted to search for an alternative marginal cost proxy through the introduction of fuller marginal cost proxy. The study has measured the level of competition by using the Boone indicator, which assumes that firms operating in a highly competitive industry would suffer if they operate inefficiently (Boone, 2008). The level of competition is measured by estimating the elasticity of revenues to marginal cost. It is measured by assessing the following regression:

$$\text{LogVROA}_{it} = \alpha + \beta_t \text{LogMc}_{ij} + \epsilon_{ij,t} \quad (3)$$

where

Log VROA_{it}: Log of bank variable revenue (the ratio of operating revenue of bank *i* to its total assets).

Log Mc_{ij}: is measured by taking the natural logarithm of the marginal cost of bank *i*.

β_t : is the time-varying parameter where the absolute value of this coefficient (i.e. Boone Index), measures the level of competition. A rise in β_t suggests a decline in competitive behaviour of the banking system.

2.6. Banks' capital (EQTA)

Bank capital is measured by book value of equity as a Percentage of Total Assets (EQTA). High share of equity to total assets indicates a lower amount of risk and higher bank stability. High capital requirement indicates a more secure banking system. This ratio illustrated the degree at which banks' assets value may drop before risking the position of its creditors and depositors. The higher the liquidity produced by the bank, the larger the potential losses are associated with the nature of illiquid assets to encounter the high demand of liquidity by depositors. Furthermore, Coval and Thakor (2005) emphasized the role of bank capital in absorbing risks and increasing risk tolerance. Therefore, high capital may allow banks to create a higher level of liquidity.

2.7. Credit risk (σ ROA)

The credit risk was measured as the standard deviation of return on assets (σ ROA). The default risk in repayment loans is related to the creation of bank liquidity, since the increase in default risk is likely to strengthen over time; thus, the expected relationship is also positive.

2.8. Profitability (ROA)

Profitable banks are able to transfer funds by providing more loans and a higher level of investment. The evaluation of profitability is important as there is a positive association between profitability and the ability of banks to provide liquidity.

2.9. Size: ln (TA)

The bank size has been measured by the natural log of total assets. This variable was added to capture possible side effects; for example, bank complexity and risk management.

2.10. Government ownership (GO)

The model included in this study comprises two types of ownership indicators; government ownership (GO) and the other is foreign ownership (F). The banks with high government and semi-government ownership are more capable of providing liquidity. The government is expected to work as insurance for the depositors in the case of adverse shocks. Foreign ownership reflects different type of regulations that are imposed on the banking sector reflecting the degree of freedom given to the banking sector. The banks with high government and semi-government ownership are more capable of providing liquidity. In the case of adverse shocks, the government was expected to work as insurance for the depositors.

2.11. Nonperforming loans to total assets (NPLTA)

A percentage of total assets was measured on the basis of non-accruing loans. This ratio is used to determine the quality of output, banks' investments in assets with high risk, and liquidity produced by the banks. However, negative relationship is expected for NPLTA.

2.12. Real GDP growth (GGDP)

Real GDP growth is directly associated with the amount of liquidity created by banks. A high correlation between oil revenues and real GDP growth is expected as oil is the main source of income among the GCC countries.

2.13. Inflation (INF)

There is a positive relation between the level of inflation and the performance of banks. The high inflation indicates an increase in the expected interest rates on loans, a high level of income, and high liquidity. On the other hand, the level of inflation and the bank costs rises, when inflation is unanticipated. This in return have an inverse effect on bank profitability and their ability to provide liquidity, given that banks are incapable of adapting appropriately.

2.14. Stock market capitalization as a percentage of GDP (MCGDP)

Stock market capitalization as a percentage of GDP is used to measure the degree of stock market development and its significance in providing adequate funding to economic activities. Demirguc-Kunt and Huizinga (1999) stated that the ratio of market capitalization to GDP is inversely associated to margins. The study advocated that financing by the banks can be replaced by a well-developed stock market. Consequently, there is strong effect of stock market on the positive impact of market capitalization on liquidity in providing financing to companies.

2.15. Statistical analysis

It is assumed that bank liquidity and growth in real GDP are the endogenously determined variables; whereas, capital and liquidity creation are jointly determined (Berger & Udell, 1994). The data would create biased coefficients as the potential endogeneity problem implies to the application of ordinary least squares (OLS). The GMM system utilizes differences of the regression equation to eliminate the expected correlation between the lagged dependent variable and the error term. Apart from the operation of regression, the data have also been analysed with the employment of descriptive statistics and correlation matrix to develop authentic association between the dependent and independent variables.

3. Results and discussion

3.1. Descriptive statistics for the variables

Table 2 has revealed that on average GCC banks produced a high degree of liquidity. The mean liquidity gap across all banks in the six countries is approximately 85%. Therefore, banks are able to convert approximately 85% of their liquid deposits into illiquid assets. The result is contrary to the results found for US banks, where the liquidity gap was approximately 20% (Deep & Schaefer, 2004). Majority of the US banks have managed to use deposits to invest to bring higher profits, as compared to GCC banks. Beta or market power has an average of 1.5 for the whole sample that is

Table 2. Summary statistics for the variables of interest

Variable	Complete sample						Conventional banks						Islamic banks					
	Mean	Std.	Min	Max	Mean	Std.	Min	Max	Mean	Std.	Min	Max	Mean	Std.	Min	Max		
LIQ	-0.840	0.1545	-1	-0.2054	-0.848	0.124	-1	-0.3454	-0.821	0.2154	-1	-0.3454	-0.821	0.2154	-1	0.2053		
EQTA	0.2372	0.226	0.0077	0.9892	0.1580	0.1084	0.0294	0.9600	0.3276	0.1251	0.0760	0.9600	0.3276	0.1251	0.0760	0.9980		
ROA	0.020	0.0324	-0.3803	0.1843	0.021	0.027	-0.98	0.139	0.0187	0.0434	-0.284	0.139	0.0187	0.0434	-0.284	0.1843		
σROA	0.016	0.0247	0	0.1548	0.014	0.21	0	0.137	0.0204	0.0317	0	0.137	0.0204	0.0317	0	0.1548		
MP	1.491	1.4501	0	6.1652	1.316	1.257	0	2.952	1.8908	1.7533	0	2.952	1.8908	1.7533	0	0.1652		
Ln(TA)	8.866	1.3726	4.0121	11.8022	8.852	1.4	4.012	11.802	8.9052	1.297	4.898	11.802	8.9052	1.297	4.898	11.3139		
(lnTA) ²	80.487	23.5961	16.0971	139.292	80.307	24.047	16.097	139.292	80.977	22.3662	23.99	139.292	80.977	22.3662	23.99	128.0058		
GO	0.1209	0.185	0	0.9988	0.114	0.167	0	0.698	0.1366	0.225	0	0.698	0.1366	0.225	0	0.9988		
Finance (F)	0.1289	0.2204	0	0.9451	0.131	0.211	0	0.945	0.1243	0.2422	0	0.945	0.1243	0.2422	0	0.8906		
NPLTA	0.014	0.025	0	0.2421	0.014	0.027	0	0.242	0.0128	0.0194	0	0.242	0.0128	0.0194	0	0.1025		
CON	0.6287	0.133	0.4473	0.9002	0.631	0.13	0.447	0.9	0.6237	0.1394	0.45	0.9	0.6237	0.1394	0.45	0.9002		
HHI	0.1923	0.0815	0	0.4448	0.129	0.081	0	0.445	0.1925	0.082	0	0.445	0.1925	0.082	0	0.4448		
GDPG	0.0594	0.0550	-0.0710	0.262														
MCGDP	0.386	0.4537	0.204	2.12														
INF	0.0309	0.0325	-0.0486	0.1681														

higher for Islamic banks compared to conventional ones. This aspect indicates that Islamic banks have more market power and are less competitive in comparison to conventional one.

On average, the total sample of banks in this study has a ROA of 2% over the period of 2002–2014. Here, the conventional banks (ROA = 2%) are slightly more profitable than Islamic banks (ROA = 1.8%). Table 2 has shown that conventional banks enjoy a lower beta on average, higher ability to provide liquidity, more profitability, and have lower government ownership than Islamic banks. Whereas, Islamic banks are more capitalized and have a lower ratio of non-performing loans to total assets. On average, the percentage growth in the Gross Domestic Product (GDP) is approximately 6% over the entire period, with the maximum growth of 26%. Therefore, the countries in our sample experience high growth on average over the study period.

Table 3 has shown the correlation between the variables under investigation. Any potential multi-collinearity problem between the independent variables was determined using bivariate analysis. The existence of multi-collinearity might cause instability of the estimated coefficient as well as an increase in the standard deviation. This problem might prevail if the correlation between variables is more than 80% (Gujarati, 2004).

3.2. Regression analysis for the impact of market power on liquidity creation

Table 4 has presented the results of bank market power (MP) and competition on bank liquidity creation. The lagged dependent variable (i.e. Liq) indicated a high degree of persistence of GCC bank liquidity creation. The results revealed that MP is positively associated with bank liquidity creation as measured by beta. On average, the GCC banks provide high liquidity to the market and are less competitive, which depicts inefficiency in the operation of the financial systems of these countries.

The banks were impacted by the financial crisis and were less able to provide liquidity during that period. The crisis had an impact on asset values, causing loss to financial institutions and rendering their ability to provide liquidity. Therefore, macro-economic instability might have dampened the business environment for banks and reduced their ability to provide liquidity to the market. This kind of behaviour has a significant impact on the economic environment. The higher risk taking and higher stability in less competitive markets is likely to be neutralized through the contribution of higher economic growth. The study has mainly focused on the impact of recent financial crisis because it significantly relates to liquidity shock as stated by Gorton and Muir (2016).

The results supported the information hypothesis, which claimed that increased bank competition reinforces financing impediments and pushes lending rates up. This hypothesis suggested that a higher level of bank competition reduces investment in banking relationships and hinders access to credit (Dell’Ariccia & Marquez, 2006). The governments in the GCC are considered as one of the major borrowers from banking sector, which contributes to decreased interest rates. These estimations supported the prediction that the ability of bank to create liquidity depends on the high bank competition. The competition is detrimental for financial stability, and the result is consistent with the findings of Berger and Udell (1994) and Beck, De Jonghe, and Schepens (2013).

Highly profitable banks possessing more market power tend to provide more liquidity to the GCC market. High market power increases bank profitability and increases the ability of banks to provide liquidity. There is a non-linear relationship between size and bank liquidity creation estimated through the coefficients on bank size measured by LnTA and LnTA2. This result suggested that intermediate-sized banks are able to provide less liquidity to the market; while, the largest institutions provide a larger amount of liquidity. The largest institutions are subjected to more control and interference by these agencies as these institutions are owned by either governmental or semi-governmental agencies. Thus, these large institutions are too large to fail and are also backed by the power of the government. The coefficient of non-performing loans to total assets is negative and statistically significant at 5% level. It

Table 3. Correlation matrix of the variables under study

	LIQ	MP	EQTA	ROA	σ ROA	lnTA	GO	F	NPLTA	GDPG	INF	MCGDPGDP
MP	0.0004	1										
EQTA	-0.1723*	0.1441*	1									
ROA	0.0901*	-0.0221	0.2105*	1								
σ ROA	-0.1960*	0.1985*	0.4294*	-0.0775*	1							
lnTA	0.3345*	-0.1411*	-0.5010*	0.0444	-0.5029*	1						
GO	0.0820*	-0.006	-0.0465	0.0311	-0.1414*	0.1200*	1					
F	-0.1026*	0.0817*	0.0376	-0.1335*	0.1796*	-0.2401*	-0.2925*	1				
NPLTA	0.0255	0.1046*	-0.1399*	-0.0867*	-0.0848*	0.1956*	-0.0609	-0.0743*	1			
GDPG	-0.0392	-0.1029*	0.1420*	0.1838*	-0.0126	-0.0505	0.0135	-0.0398	-0.1428*	1		
INF	0.0213	-0.0376	0.0116	-0.0900*	0.0730*	0.2179*	-0.1260*	0.0710*	0.1910*	0.1097*	1	
MCGDPGDP	0.0633	-0.028	0.0485	0.0734*	0.1777*	0.0435	-0.1203*	0.1499*	-0.1265*	0.1766*	0.3773*	1

*Significant at the 5% level.

Table 4. Regression results of the impact of market power on liquidity creation

Dependent variable/LIQ	Total sample model	
	Without crisis	With crisis (Column 2)
Independent variables		
Lag 1 LIQ	0.4390 (0.0128)*	0.4113 (0.0161)*
MP	0.0874 (0.0083)*	0.0817 (0.0084)*
EQTA	-0.0305 (0.0219)*	-0.0371 (0.0211)*
ROA	0.0010 (0.0002)*	0.0011 (0.0027)*
σROA	-3.7840 (0.6260)	-4.560 (0.902)
lnTA	-0.2320 (0.0197)*	-0.2121 (0.0214)
(LnTA) ²	0.0143 (0.0017)*	0.01330 (0.0013)*
GO	-0.0355 (0.0177)*	-0.0470 (0.0137)*
F	-0.0279 (0.0082)*	-0.0460 (0.0137)*
NPLTA	-0.109(0.0389)*	-0.1782(0.0424)*
Macroeconomic variables		
GDPG	-0.0002 (0.0092)*	-0.0010 (0.0012)*
INF	-0.0046 (0.0074)*	-0.0043 (0.0008)*
MCGDP	0.000035 (0.00002)*	-0.00002 (0.00001)*
DCRISIS		-0.0133 (0.0018)*
MP DCRISIS*		0.0086(0.0009)*
Constant	0.3690 (0.0969)**	0.2691 (0.101)
Sargan Test (Prob >chi2)	54.88 (0.9609)	54.2941(0.9657)
AR (1)	-3.1537 (0.0016)*	-3.2404 (0.0012)*
AR (2)	0.3273 (0.7434)	0.26106 (0.7940)

*Significant at the 5% level, ** Significant at the 10% level.

suggested that banks with high credit risks provide less liquidity to the market; hence, banks are willing to take low risks in their projects. This aspect makes it costly for banks to build up long-term relationship with firms. Consequently, high competition is expected to reduce liquidity by the banks (Black & Strahan, 2002).

The regression results showed a negative and significant relationship between well-capitalized banks (EQTA) and liquidity creation. The results are consistent with the literature that argued about the capital requirement regulations and high social costs constraints imposed on the banks (Gorton & Winton, 2014). The capital requirement regulations and high social costs reduce the ability of bank to create liquidity by crowding out deposits. The findings suggested that the demand for loans increases, when investors have valuable investment projects during expansion (Gorton & Winton, 2014). Thus, banks that want to satisfy the increased demand for loans might not be able to cope up with it and there is reduction in their ability to provide liquidity. These results are consistent with the results of Vodova (2011). The demand for credit and the amount of anticipated inflation increases, when the economy is booming. The negative relationship between inflation and bank liquidity creation is consistent with the results of Moussa (2015). The analysis was expanded further by investigating the effects of crisis on the relation between market power and bank liquidity creation. The crisis is expected to impact the liquidity created by banks and market power. The analysis was re-run by adding a dummy variable equal to one for the crisis period 2008–2010, or else zero, to examine the effect of crisis. For this purpose, an interaction term was added between the crisis dummy variable and the market power measure (MP*DCRISIS).

3.3. Robustness tests for impact of market power on liquidity creation

The concentration ratio (measured by the per cent of assets of the largest three banks as a per cent of total banking assets) and the Herfindahl-Hirschman index (HHI index) were considered as a measure of market power. According to Berger and Bowman (2009), liquidity creation is measured by classifying loans by maturity and excludes off-balance-sheet activities. However, Berger and Udell (1994) do not consider the off-balance-sheet items and liquidity creation pattern resembles the pattern of their other measures. The banking sector in the GCC region still relies on the traditional banking business as the main source and use of funds. The results are significantly affected by considering liquidity measures, including the off-balance-sheets items.

The mat-nonfat method classifies all short-term loans of up to one year as semi liquid, and all long-term loans of over one year as illiquid that helped in classifying the investments in subsidiaries and properties as illiquid assets. Cash, securities, and other marketable securities are classified as liquid assets. Equity is classified as illiquid since it has no maturity. Therefore, the measure is formulated as follows:

$$\text{Mat - nonfat} = \frac{\left[\frac{1}{2} * \text{illiquid assets} - \frac{1}{2} * \text{liquid assets} + \frac{1}{2} * \text{liquid liabilities} - \frac{1}{2} * \text{illiquid liabilities} - \frac{1}{2} * \text{equity} \right]}{\text{Gross Total Assets}} \quad (4)$$

Table 5 has shown the results of regressing the MP and other independent variables on the liquidity measured by Mat-nonfat. This aspect is also reflected in the negative relationship between non-performing loans and the liquidity measure. Table 5 has also shown the negative impact of the financial crisis on the ability of banks to provide liquidity. The crisis exerts a negative impact on banks' ability to provide liquidity; however, the market power during the crisis period dampens the effect of the crisis in the banks' ability to provide liquidity.

The analysis is used to identify the differences between the effects of market power on the ability of conventional and Islamic banks to provide liquidity (Table 6). This decomposition allows to draw conclusions about the roles played by different types of banks in liquidity creation. The regression results for conventional banks are shown in Table 6. Moreover, the sign and the significance on the coefficient of market power for both banks did not change and was positive and significant. The higher the market power, the higher the liquidity provided by both conventional and Islamic banks. The results for conventional banks are similar to the outcomes on the total sample, except for the profitability ratio. A significant and negative relationship was found between the crisis period dummy and banks' ability to provide liquidity after adding a dummy for the crisis period and an interaction variable. This result might indicate the low infusion of liquidity to banks that are highly owned by governments. The interaction variable turns out to be positive and significant for conventional banks; while, it was negative for Islamic banks. The negative coefficient for Islamic banks indicated that the financial crisis had an impact on the relationship between Islamic bank market power and bank ability to provide liquidity. The bank moral hazards inducing excessive risk-taking are minimized through higher level of bank capitalization in less competitive market, despite its insufficiency. Higher risk-taking behaviour and higher bank stability in the less competitive markets is mitigated through strong economic growth. The economic problems are likely to occur in the expansionary economic environments.

For conventional banks, the interaction variable has the similar sign as the banks market power. This aspect suggested that the crisis period exerts a negative impact of bank market power on the ability of Islamic banks to provide liquidity; while, it exerts a positive impact on conventional banks. The relationship between bank size and the ability to provide liquidity is non-linear for both types of banks. Furthermore, non-performing loans to total assets has a negative and significant impact on conventional banks, exerting no impact on Islamic banks.

The effect of competition on liquidity was considered to be created by the GCC banking system, using the concentration ratio first and then the HHI index. Table 7 has shown the regression outcomes of competition measured by concentration ratio on the banks' ability to provide liquidity

Table 5. Regression results of the impact of market power on liquidity creation measured by mat-non-fat without crisis, with crisis dummy and with Islamic dummy

Dependent variables/ mat-non-fat variables	Without crisis intercept (p-value)	With crisis intercept (p-value)	With Islamic and crisis intercept (p-value)
L.Mat-nonfat	0.3810 (0.0074)*	0.3791 (0.0055)*	0.3140 (0.0134)*
MP	0.0142 (0.0033)*	0.0148 (0.0027)*	0.0162 (0.0224)*
EQTA	-0.6265 (0.0130)*	-0.6087 (0.0091)*	-0.6952 (0.0160)*
ROA	0.0004 (0.0007)*	0.0027 (0.0002)*	0.0072 (0.0001)*
σROA	0.4880 (0.0369)*	0.4679 (0.0502)*	0.4977 (0.143)
lnTA	-0.1343 (0.0102)*	-0.1343 (0.0065)*	-0.0573 (0.0099)*
(lnTA) ²	0.0079 (0.0006)*	0.0082 (0.0037)*	0.0036 (0.0059)*
GO	0.0223 (0.0043)*	0.0259 (0.0047)*	0.0191 (0.0092)*
F	-0.0745 (0.0063)*	-0.0643 (0.0071)*	-0.0347 (0.0119)*
NPLTA	-0.1209 (0.0213)*	-0.0597 (0.0276)*	-0.0204 (0.0232)*
GDPG	-0.0002 (0.0009)*	-0.0007 (0.0001)*	-0.0059 (0.0069)*
MCGDP	-0.0427 (0.0031)*	-0.0338 (0.0046)*	-0.0343 (0.0041)*
INF	-0.0016 (0.0054)*	-0.0067 (0.0065)*	-0.0052 (0.0072)*
D Islamic			0.2661 (0.0515)*
Interaction (Islamic*MP)			-0.0558 (0.0349)*
DCRISIS		-0.00527 (0.0027)*	-0.00873 (0.0015)*
(MP* DCRISIS)		0.00226 (0.0011)*	-0.00037 (0.0012)*
Constant	-0.7894 (0.0382)*	-0.7938 (0.0292)*	-0.5430 (0.0572)*
Sargan Test (Prob >chi ²)	58.1813 (0.9245)	50.9944 (0.9848)	45.9144 (0.9945)
AR (1)	-2.0342 (0.0419)*	-2.0684 (0.0386)*	-2.0122 (0.0442)*
AR(2)	0.1607 (1.4028)	0.2808 (1.0786)	0.86374 (0.3877)

*Significant at the 5% level, *Significant at the 10% level

for the whole sample and for both conventional and Islamic banks. The results indicated a positive relationship between the lag of liquidity and the current level of liquidity, which indicated persistent liquidity in GCC banking system. The level of concentration, measured by the assets of three largest banks in each country, showed a positive and significant relationship to bank liquidity. Therefore, concentration exerts a positive impact on the banks' ability to provide liquidity. All independent variables have the similar significance and directional relation to bank liquidity.

The presence of negative coefficient for the conventional bank is the only difference concerned with the interaction between the crisis and the concentration ratio. Therefore, the bank concentration during the crisis exerts a negative effect on liquidity of both conventional and Islamic banks, using the concentration ratio as the measure of market power. The negative relationship between market power and bank liquidity for Islamic banks was found on the basis of statistical values, which indicate negative and insignificant relationship with Islamic banks in both crisis and without crisis period. The negative relationship between market power and bank liquidity might exist due to the dearth of solidarity of Islamic banks as compared to conventional banks in terms of liquidity measures.

Table 8 has shown the regression results of competition as measured by HHI on banks' ability to provide liquidity for the whole sample and for both conventional and Islamic banks. The results are similar to those with MP, with a concentration ratio used to measure market power. The results revealed that the crisis exerts a positive effect on bank liquidity by using HHI for the total sample.

Table 6. Regression results of the impact of market power on liquidity creation for conventional and for Islamic banks with and without intercepts

Dep. Var./LIQ	Conventional banks		Islamic banks	
	Without crisis intercept (p-value)	With crisis intercept (p-value)	Without crisis intercept (p-value)	With crisis intercept (p-value)
L.LIQ	0.4330 (0.0413)*	0.4562 (0.0371)*	0.3564 (0.0914)*	0.3700 (0.0919)*
MP	0.0980 (0.0205)*	0.0869 (0.0195)	0.0553 (0.0185)*	0.0477 (0.0198)*
ROA	-0.0048 (0.0007)*	-0.0094 (0.0068)*	0.0021 (0.0016)*	0.0019 (0.0016)*
σROA	-1.7740 (1.4750)	-1.9640 (1.5100)	-4.1310 (1.5010)	-4.0240 (1.5060)
EQTA	-0.0473 (0.0430)*	-0.0387 (0.0384)*	0.0636 (0.1330)	0.115 (0.1410)
lnTA	-0.1280 (0.0263)*	-0.1380 (0.0255)*	-0.3300 (0.1160)	-0.2890 (0.1210)
(lnTA) ²	0.0084 (0.0015)*	0.0091 (0.0014)*	0.0212 (0.0067)*	0.0189 (0.0069)*
GO	-0.0174 (0.0172)*	-0.0314 (0.0205)*	-0.168 (0.1220)	-0.148 (0.1220)
F	0.0366 (0.0059)*	-0.0603 (0.0244)*	-0.3780 (0.1010)**	-0.3770 (0.1001)**
INF	-0.00320 (0.0014)*	-0.0034 (0.0012)*	-0.0119 (0.0059)*	-0.0103 (0.0060)*
NPLTA	-0.1150 (0.0610)*	-0.1550 (0.0700)*	0.3690 (0.4010)	0.3580 (0.4011)
GDPG	-0.0004 (0.0002)*	-0.0004 (0.00024)*	-0.0016 (0.0014)*	-0.0021 (0.0015)*
MCGDP	0.00796 (0.0062)*	0.00796 (0.0060)*	-0.0140 (0.0299)**	-0.0104 (0.0300)**
DCRISIS		-0.0156 (0.0032)		-0.0111 (0.0202)*
(MP*DCRISIS)		0.0065 (0.0013)*		-0.0021 (0.0083)*
Constant	-0.0564 (0.1270)	-0.0342 (0.1341)	0.7880 (0.5010)	0.6270 (0.5190)
Sargan Test (Prob >χ ²)	36.8582 (0.999)	34.1972 (0.999)	49.136 (0.98)	49.132.152 (0.99)
AR (1)	-2.5144 (0.0116)*	-2.5586 (0.0105)*	-2.7068 (0.0144)*	-2.6398 (0.0083)*
AR(2)	0.36798 (0.6907)	0.7353 (0.7421)	0.8675 (0.8561)	0.7521 (0.9231)

*Significant at the 5% level, **Significant at the 10% level.

During the crisis period, the concentration had a negative effect on banks' liquidity. The profitability among Islamic banks is greater as compared to the conventional banks as the total loan and total asset for Islamic bank is higher than conventional banks. The results also showed that there is no significant factor that affects profitability, which measures ROA with the independent variable.

The deeper structural changes and pressures in the financial system are highlighted on the basis of liquidity shocks that are likely to lead to global financial crisis. The liquidity creation by the banks has changed due to significant transformations taking place in the financial markets (Berger & Sedunov, 2017). Recently, it has been shown that an important part of liquidity creation by the bank lies outside the banking system. The traditional liquidity creation by the banks significantly depends on the amount of credits that is willingly extended by the bank. Moreover, there is significant impact of market liquidity on the asset side of bank balance sheet resulting in active management of the portfolios. There is significant impact of liquidity on the market having potential implication on the level of bank competition among the market participants (Bawazira, Degl'innocentia, & Wolfea, 2018). The market power is important in formulating appropriate regulatory policies. Moreover, the relationship between bank regulatory capital is investigated as liquidity creation has become a new research topic.

4. Conclusion

This study has examined the relationship between bank market power and liquidity creation by GCC banks. The findings have suggested that the increase in market power (or the decrease in

Table 7. Regression results of the impact of market power on liquidity creation for the complete model, for conventional banks and for Islamic banks with and without crisis intercept

Dep. Var./LIQ	Complete Model Model (1)		Conventional Banks Model (2)		Islamic Banks Model (3)	
	Without crisis intercept (p-value)	With crisis intercept (p-value)	Without crisis intercept (p-value)	With crisis intercept (p-value)	Without crisis intercept (p-value)	With crisis intercept (p-value)
L.LIQ	0.4340 (0.0156)*	0.4020 (0.0169)*	0.4680 (0.0177)*	0.4830 (0.0280)*	0.2420 (0.0894)**	0.2420 (0.0889)**
CON	0.3620 (0.0207)*	0.3980 (0.0263)*	0.1640 (0.0437)*	0.1610 (0.0488)*	-0.6190 (0.1370)	-0.6730 (0.1390)
ROA	-0.0676 (0.0235)*	-0.0962 (0.0192)*	0.0617 (0.0347)*	0.1050 (0.0286)*	-0.2350 (0.1330)	-0.2430 (0.1340)
σROA	-5.5320 (0.8160)	-6.0300 (0.7670)	-2.1440 (1.5890)	(1.0240) (1.8130)	4.9660 (1.4070)	4.7850 (1.4070)
EQTA	0.0314 (0.0850)**	0.02944 (0.0820)**	0.0897 (0.0001)*	0.0979 (0.0001)*	-0.06137 (0.5880)	-0.0820 (0.4820)
lnTA	0.1890 (0.0242)*	0.2140 (0.0234)*	0.1030 (0.0337)*	0.0715 (0.0301)*	0.3810 (0.1090)**	0.325 (0.1110)
(LnTA)2	-0.0112 (0.0014)*	-0.0127 (0.00138)*	-0.00658 (0.00184)*	-0.00503 (0.00168)*	-0.0226 (0.0062)*	-0.0193 (0.0063)*
GO	-0.0363 (0.0244)*	-0.0499 (0.0276)*	-0.0048 (0.0134)*	0.00672 (0.0124)*	-0.1690 (0.1170)	-0.1440 (0.1160)
F	0.0487 (0.0089)*	0.0513 (0.0138)*	-0.0343 (0.00523)*	-0.02710 (0.0275)*	0.3990 (0.0899)**	0.3770 (0.0904)**
INF	-0.0044 (0.00086)*	-0.0029 (0.00074)*	-0.0042 (0.00112)*	-0.0025 (0.0017)*	-0.0088 (0.0055)*	-0.0062 (0.0056)*
NPLTA	-0.0811 (0.0342)*	-0.1271 (0.0383)*	-0.1270 (0.0501)*	-0.2197 (0.0551)*	-0.398 (0.3790)	-0.381 (0.3770)
GDPG	-0.0008 (0.0002)*	-0.0015 (0.00016)*	-0.00044 (0.00017)*	-0.0009 (0.00023)*	-0.0013 (0.0014)*	-0.0022 (0.0014)*
MCGDP	0.0168 (0.0038)*	0.0211 (0.0355)*	0.0137 (0.0055)*	0.00998 (0.0064)*	-0.0252 (0.0281)*	-0.022 (0.0281)*
DCRISIS		-0.0191 (0.0019)*		-0.0218 (0.0030)*		-0.0309 (0.0185)*
(CON* DCRISIS)		-0.0017 (0.0088)*		-0.0041 (0.0016)*		-0.0017 (0.0079)*
Constant	-0.6300 (0.1140)	-0.7430 (0.0947)**	-0.0760 (0.1750)	-0.0739 (0.1500)	-1.5280 (0.4880)	-1.322 (0.4940)
Sargan Test (Prob >chi2)	56.104 (0.9578)	59.273 (0.9216)	37.631 (0.9999)	36.06943 (0.999)	96.127 (0.998)	89.772 (0.9337)
AR (1)	-2.5210 (0.0013)*	-2.5497 (0.0012)*	-2.6860 (0.0063)*	-2.5562 (0.0013)*	-2.3432 (0.0221)*	-2.6534 (0.0318)*
AR(2)	0.3424 (0.81270)	0.5479 (0.8710)	0.7869 (0.6791)	0.8854 (0.7232)	0.7650 (0.8180)	0.9675 (0.9271)

*Significant at the 5% level.

Table 8. Regression results of the impact of HHI on liquidity creation for the complete model, for conventional banks and for Islamic banks with and without crisis intercept

VARIABLES	Complete model		Conventional banks		Islamic banks	
	Without crisis intercept (p-value)	With crisis intercept (p-value)	Without crisis intercept (p-value)	With crisis intercept (p-value)	Without crisis intercept (p-value)	With crisis intercept (p-value)
L.LIQ	0.5020 (0.0106)*	0.484 (0.0127)*	0.5050 (0.0278)*	0.4960 (0.0305)*	0.3920 (0.0914)**	0.3990 (0.0908)**
HHI	0.2690 (0.0249)*	0.2460 (0.0314)*	0.1460 (0.0319)*	0.1410 (0.0344)*	0.4910 (0.2170)	0.5200 (0.2180)
ROA	0.0603 (0.0223)*	0.0841 (0.0236)*	0.1212 (0.0389)*	0.0952 (0.0384)*	-0.198 (0.1430)	-0.207 (0.1420)
σROA	4.1200 (0.5990)	4.3110 (0.5570)	2.2120 (1.0390)	1.6420 (1.4360)	4.4820 (1.5030)	4.3240 (1.5020)
EQTA	.01607 (0.0490)*	.03088 (0.1390)	.06890 (0.0080)*	0.0981 (0.0020)*	-0.1858 (0.1170)	-0.1860 (0.1340)
LnTA	0.2200 (0.0154)*	0.2370 (0.0197)*	0.1140 (0.0358)*	0.1110 (0.0350)*	0.2600 (0.1130)	0.2090 (0.1150)
(LnTA)2	-0.0134 (0.0089)*	-0.0145 (0.0011)*	-0.0075 (0.0021)*	-0.0074 (0.0020)*	-0.0166 (0.0064)*	-0.0137 (0.0066)*
GO	0.0824 (0.0200)**	0.0982 (0.0242)**	0.0143 (0.0133)*	0.0065 (0.0155)*	0.1050 (0.1240)	0.0875 (0.1240)
F	0.0679 (0.0103)*	0.0806 (0.0105)*	-0.0220 (0.0055)*	-0.0276 (0.0262)*	0.4640 (0.0920)**	0.4530 (0.0920)**
NPLTA	-0.0928 (0.0509)*	-0.1720 (0.0428)*	-0.1040 (0.0430)*	-0.1530 (0.0613)**	-0.3500 (0.4080)	-0.3490 (0.4060)
INF	-0.0063 (0.0088)*	-0.0036 (0.0012)*	-0.0042 (0.0014)*	-0.0015 (0.0016)*	-0.0082 (0.0059)*	-0.0061 (0.0059)*
GDPG	-0.0007 (0.0013)*	-0.0012 (0.0014)*	-0.00034 (0.0018)*	-0.0083 (0.0002)*	-0.0013 (0.0015)*	-0.0020 (0.0015)*
MCGDP	0.0181 (0.0051)*	0.0228 (0.0045)*	0.00796 (0.0062)*	0.00796 (0.0060)*	-0.0140 (0.0299)*	-0.0104 (0.0300)*
(HHI* DCRISIS)		0.0148 (0.0017)*		-0.0084 (0.0016)*		0.0045 (0.0084)*
Constant	-0.5980 (0.0684)**	-0.6560 (0.0957)**	-0.0555 (0.1390)	-0.0336 (0.1370)	-0.7590 (0.4860)	-0.5490 (0.4970)
Sargan Test (Prob >chi2)	56.56841 (0.9535)	54.2923 (0.9718)	37.85822 (0.9999)	35.19722 (1.0000)	102.1366 (0.9980)	98.15952 (0.9999)
AR (1)	-3.2355 (0.0012)*	-3.234 (0.0014)*	-2.4654 (0.0106)*	-2.4560 (0.0058)*	-2.7540 (0.0144)*	-2.7548 (0.0135)*
AR(2)	0.3369 (0.8080)	0.2030 (0.9011)	0.3754 (0.6907)	0.7443 (0.7409)	0.8554 (0.8611)	0.7871 (0.9911)

*Significant at the 5% level, **Significant at the 10% level.

competition) increases the ability of GCC banks to create liquidity using all other measures of market power and different liquidity measures. There is negative and significant relationship between the variables of inflation and growth in GDP, and the banks' ability to provide liquidity. Thus, the banks, which want to satisfy the increased demand for loans, might not be able to cope up with it resulting in decreased ability to provide liquidity. The results showed a slightly significant (at 10% significance level) difference in business between Islamic and conventional banks in the regression of market power and macro-economic factors on the ability of banks to provide liquidity.

It was also suggested that increased competition among banks tend to reduce bank profitability and increases the non-performing loans, which results in reduction of the bank incentives to provide liquidity. Moreover, there is significant impact of market liquidity on the asset side of bank balance sheet resulting in active management of the portfolios. There is significant impact of liquidity on the market having potential implication on the level of bank competition. There is no difference in the ability of conventional and Islamic banks to provide liquidity. It is recommended that banks in GCC should be focused for providing more detailed information about off balance sheet items and be more transparent that would help researchers to develop a better measure of liquidity creation. Future studies need to be based on off-balance-sheet items investigation along with analysing specific products and the business lines provided by the Islamic banks.

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