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Econometric modeling of the effect of financial derivatives usage on banks' accounting risks

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Abstract:
Through the financial liberalization process and policies, the banking sector has been affected considerably and thereby the risk that banks faced is increasing. As a result, banks especially from emerging markets were obliged to enter to new profitable markets such as those of derivatives. This paper has the aim to investigate whether the use of financial derivatives by banks from GCC countries affect their accounting risk. Using a sample of 25 banks during the period 2006-2020, the major result shows that the use of financial derivatives reduces banks' accounting risks. Hence, the main finding is that banks are not at risk by using financial derivatives.
Keywords: derivatives; banks; accounting risks; GCC countries; GMM.

JEL Classification Codes: G21; G32

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Introduction:

Due to the increasing use of financial derivatives and the instability of financial markets, the banking sector as a part of the financial sector has known enormous changes and fluctuations. Hence, the banking sector seeks to diversify their activities by using financial derivatives in order to hedge the risks that can be caused by the changes in the financial markets.

An overview of literature show that the use of financial derivatives in beneficial for banks.(**Mohamed Keffala, 2012**) argue that banks are motivated to use financial derivatives to create revenues besides to the traditional operations ones. Consequently, the derivative markets have grown rapidly during the last years due to their benefits. Other studies show that financial risk management becomes an indispensable function in many institutions. These latter's start to use financial derivatives in order to hedge against the fluctuations in asset prices and other risks. The appropriate use of financial derivatives can create value for the shareholder; reduce the volatility of the cash flows and accounting profit. Thus, their use allows companies to pay a regular dividend **(Butler, 2009)**. As a result, risk management with financial derivatives has attracted much attention recently and becoming an important topic in the financial literature.

Regarding the limited number of studies focusing on derivatives usage in banks from developed countries, our work intends to fill this gap by focusing on banks from GCC countries.

The current study aims to analyze the effect of financial derivatives usage on banks' accounting risks, by asking the following question:

How can financial derivatives usage affect the accounting risks of banks from GCC countries during the period 2006- 2020?

The remainder of the paper is planned as follows. First, we collect empirical literature about the relationship between financial derivatives and risks of banks. Moreover, we represent the methodology used in this paper. Lastly, the empirical results are analyzed and discussed followed by a conclusion.

1- Literature review

Researches regarding the increasingly important role derivatives in risk management in banks have large investigations. The following literature represents only studies on the banking sector.

(Brewer Iii, Minton, & Moser, 2000) investigate by the pooled cross-sectional time-series regressions, the relation between interest-rate derivatives and bank lending on 734 FDIC insured commercial banks greater than USD 300 million during the period (1985-1992), the result indicates that commercial and industrial loan growth is significantly and positively related to the beginning of period capital-asset ratios, and the previous period's state-employment growth (EMPG). When using interest-rate derivatives, commercial banks reduce their systematic exposures of changes in interest rates and increase their ability to provide more C and I loans.

(Minton, Stulz, & Williamson, 2005) examine the use of credit derivatives by US bank holding companies from 1999 to 2003. They conclude that use of credit derivatives enable banks to save capital, although that at the same time it reduce their cost of loans and make banks more competitive with the capital markets for the provision of loans.

Using Fama-Mac Beth regression, cross-sectional analysis, and panel data on a sample of 8000 insured commercial bank in the US during 1980-2003, **(Purnanandam, 2007)** find that the interest rate risk has an impact on banks, and it provides a useful setting to test theories of risk management, in addition, derivatives user banks adjust their lending, and investing policies less than non- user, and the lending volume remains unaffected by the change in the fed fund rate suggests that the presence of derivatives can change the impact of monetary policies.

In investigating the determinants of financial derivatives use and examine their effect on banks 'risk, **(Shiu & Shin, 2010)** use a sample of 35 banks from Taiwan during the period 1998-2005. The main conclusion of their study is that the financial derivatives are used for risk management although there is no evidence that financial derivatives use has any effect on banks' risk.

Moreover, **(Mohamed keffala, De Peretti, & Chan, 2012)** seek to investigate the effect of derivatives instrument use on capital market risk, for a sample of 52 bank from emerging and 9 banks from recently developed during 2003- 2009, using panel data, this investigation conclude that the use of options tends to increase all types of bank risk, swaps, forwards and futures negatively affect capital market risk, in other hand the options contract may be used for speculative purposes, while swaps, forwards and futures used for hedging.

Using a sample of European listed banks consisting of the EU-15 countries and Switzerland from 1998 to 2012, **(Mano, 2013)** aims to identify whether the use of financial derivatives affect banks' idiosyncratic risk and their systemic risk. He concludes that there is a positive relation between the use of derivatives and both idiosyncratic and systemic banks' risk, indicating that the use of financial derivatives increases both idiosyncratic and systemic risks.

To examine the impact of financial derivatives on banks' systematic risks, **(Rodriguez-Moreno, Mayordomo, & Peña, 2013)** use a sample of 95 bank holding companies from US during the period 2002 to 2011. They find that banks that use foreign exchange and credit derivatives have higher systemic risk, while banks that use interest rate derivatives have lower systemic risks. In addition, non-performing loans and leverage have stronger effect on banks systemic risk than derivatives activities.

(Kornel, 2014) examines the effect of using derivatives on banks risk choosing a sample of 9 banks from Hungary from 2003 to 2012 and using a Panel date analysis, he finds that the use of futures, forwards and swaps tend to increase liquidity, leverage and credit risks while the use of options lower leverage, liquidity and credit risks.

In order to determine the risk managements practices and to examine the use of financial derivatives in banks from Pakistan, **(Kouser, Mahmood, Aamir, & Bano, 2016)** use 36 financial firms listed on the Karachi stock exchange during the period 2005 to 2012. The study shows that firms are motivated to enter into derivative markets when they are in short of funds. Additionally, solvency and growth are positively related to derivatives usage and firms that have foreign business operation use financial derivatives as well.

(Zakaria, 2017) present a new approach for measuring risk managements efficiency levels in banks using DEA analysis, he concludes that Japanese banks are superior in terms of managerial efficiency compared to European and US banks and the risk management using financial derivatives contributes to the strengthening of the efficiency levels of risk management.

In the paper of **(Huan & Parbonetti, 2019)**, they aim to test the relation between derivatives usage and banks' risk. Using a sample of 555 banks from eighteen developed markets during the period 2006 to 2015, they conclude that the use of financial derivatives increase banks 'risks.

As a conclusion, the literature findings show that the use of financial derivatives by banks is beneficial to them because by using derivative instruments banks are hedging their risks. This results is supporting by the studies of **(Brewer Iii et al., 2000)**; **(Minton et al., 2005)**; **(Purnanandam, 2007)**; **(Shiu & Shin, 2010)**; **(Kornel, 2014)**; **(Kouser et al., 2016)** and **(Zakaria, 2017)**.

In contrast, other studies find that financial derivatives usage increases banks risk such as the studies of **(Mano, 2013)**; **(Chen & Kim, 2014)** and **(Huan & Parbonetti, 2019)**.

Moreover, some papers studied the effect of financial derivative instruments on banks' risk separately. The study of **(Mohamed keffala et al., 2012)** conclude that except for options all derivative contracts decrease the risks that banks face. Furthermore, the study of **(Rodriguez-Moreno et al., 2013)** find that foreign exchange and credit derivatives tend to increase risks in banks while interest rate derivatives decrease banks' risk.

The presented literature is focusing on the effect of financial derivatives usage in banks especially banks from developing countries. Thus, the current work will focus on banks from emerging countries in order to distinguish and compare the use of derivatives and its effects risk in banks across emerging countries.

2- Empirical study

The aim of this analysis is to examine the effect of derivative instruments on banks' accounting risks starting with leverage risk, then liquidity risk and lastly credit risk. Therefore, this part is organized as follow: Data and sample are described, as well as the methodology in first place then estimation results and analysis and lastly summaries and discussions are provided.

2-1 Data

In order to achieve the aim of this analysis, an annual accounting data of each bank were used in our model as dependent and independent variables obtained from Bank Focus data base during the period 2006-2018.

2-2 Sample

Our sample is composed of 25 banks from GCC countries described in the following table:

Table number (1): Bank names and their countries

Countries	Bank names
United Arab Emirates	1. Emirates NBD PSG
	2. Abu Dhabi Commercial Bank
	3. Mashreq Bank PSG
	4. Union National Bank
	5. Commercial Bank of Dubai PSC
Bahrain	1. Ahli United Bank BSC
	2. Arab Banking Corporation
	3. BBK BSC
Kuwait	1. National Bank of Kuwait
	2. Ahli United Bank KSC
Qatar	1. Qatar National Bank
	2. The Commercial Bank
	3. Doha Bank
	4. Alkhalij Commercial Bank
	5. Ahli Bank
Saudi Arabia	1. Riyad Bank
	2. Samba Financial Group
	3. Saudi British Bank
	4. Banque Saudi Fransi
	5. Arab National Bank
	6. Saudi Investment Bank
Oman	1. Bank Muscat SAOG
	2. National Bank of Oman
	3. HSBC Bank Oman
	4. Oman Arab Bank

Source: by the authors.

2-3 Variables description

The following table represents both dependent and independent variables used in this analysis.

Table number (2): Variables definition

Variables	Proxy	Definition	References
Dependent variable			
Leverage risk	Accounting risk	The ratio of the total equity divided on total asset	Keffala (2012)
Liquidity risk		The ratio of liquid assets to total assets	Keffala (2012); (Li & Marinč, 2014); (Kornel, 2014).
Credit risk		The ratio of loan loss-reserves to gross loans.	Keffala (2012); (Li & Marinč, 2014); (Kornel, 2014).
Independent variables			
Derivatives	Derivatives	The notional value of derivatives divided by total assets.	Chaudhry et al (2000); Reichert and Shyu (2003).
Size	Bank size	Natural log of total assets.	Chaudhry et al (2000); Reichert and Shyu (2003).
NIM	Net interest margin	The difference between total interest income and total interest expense expressed as a percentage of total assets.	Chaudhry et al (2000); Reichert and Shyu (2003).

Source: by the authors depending on literature review

From the above table, the dependent variable is divided to three measures as proxies for accounting risks of banks. Represented in leverage risk, liquidity risk and credit risk as described earlier. For the independent variables, we have derivative instruments, bank size, net interest margin. The choice of these variables is according to previous studies and literature as described in the previous table.

2-4 Testing hypotheses and expected results

Previous studies such as (Chaudhry et al 2000, Reicchert and Shyu 2003; Keffala 2012) found that overall derivative instruments affect negatively bank risk. Hence, our second hypothesis stipulates that the effect of derivative instruments is negative on banks' risks.

For variables bank size and net interest margin according to literature and the theory, they have a positive effect on bank accounting risks (Chaudhry et al 2000, Reichert and Shyu 2003; Keffala 2012).

The table below provides the predicted effect of the independent variables and their references.

Table number (3): The predicted relationship between dependent variable and independent variables

Variables	Expected sign	References
Derivatives	-	(Chaudhry et al 2000, Reichert and Shyu 2003, Keffala 2012)
Size	+	(Chaudhry et al 2000, Reichert and Shyu 2003, Keffala 2012)
NIM	+	(Chaudhry et al 2000, Reichert and Shyu 2003, Keffala 2012)

Source: by the authors depending on literature review results

3- Results and Discussions

3-1 Empirical model

The equation below represents the conceptual model of the second part of this section which describes the effect of derivatives on accounting risk of banks.

$$Accounting\ risk_{i,t} = \alpha_0 + \alpha_1 Derivatives_{i,t} + \alpha_2 Size_{i,t} + \alpha_3 NIM_{i,t} + \varepsilon_{it}$$

Where:

Accounting risk measures are leverage risk, liquidity risk and credit risk in each regression.

ε_{it}: is the random error.

The other variables are defined previously.

3-2 Unit root test

As seen below, the stationarity of the variables is checked using several tests. Trying with individual intercept, then individual intercept and trend and finally without individual intercept and trend. The results are as follow:

Table number (4): Stationarity test results

Variables	LLC	IPS	ADF	PP	Decision
Leverage risk	-21.2359 (0.0000)	-12.2931 (0.0000)	154.671 (0.0000)	228.136 (0.0000)	Stationary at level
Liquidity risk	-3.03821 (0.0012)	-3.33152 (0.0004)	89.4603 (0.003)	109.291 (0.0000)	Stationary at level
Credit risk	-8.49817 (0.0000)	-3.90960 (0.0000)	94.4634 (0.0001)	71.5909 (0.0242)	Stationary at level
Derivatives	-63.0980 (0.0000)	-12.1034 (0.0000)	82.7248 (0.0025)	78.7588 (0.0058)	Stationary at level
Size	-37.6437 (0.0000)	-15.4769 (0.0000)	99.9018 (0.0000)	115.241 (0.0000)	Stationary at level
NIM	-11.5902 (0.0000)	-6.03045 (0.0000)	133.797 (0.0000)	156.317 (0.0000)	Stationary at level

Source: by the authors depending on Eviews 9 results

According to the results of table (4), the stationarity of all variables is checked since the P value of the majority of tests is closed to 0, which means we reject the null hypothesis of Unit Root at 5 % significance level.

3-3 Descriptive statistics

The results of descriptive statistics test show that UAE banks are the most users of derivative instruments in GCC countries with a standard deviation of 0.0085. Moreover, the Saudi Arabian banks are the larger banks while the smallest banks are Kuwait banks. As for net interest margin the highest scores are in UAE banks followed by Oman, Qatar, Kuwait, Bahrain and lastly Saudi Arabia where the standard deviation in UAE is the highest with a score of 0.5527 and the lowest standard deviation is in Kuwait, the high liquidity levels is in Kuwait banks followed by Oman, Bahrain, UAE, Qatar and lastly Saudi Arabia, for the standard deviation which is a measure of risk the highest level is in Bahrain and the lowest in Saudi Arabia. In addition, UAE banks have the highest level of credit risk followed by Saudi Arabia, Bahrain, Oman, Kuwait and lastly Qatar, while the standard deviation high level is in UAE and the lowest is in Kuwait. Finally, the highest level of leverage risk is in UAE banks followed by Saudi Arabia, Qatar, Bahrain, Kuwait and lastly Oman, while the standard deviation of this risk was lower in both Saudi Arabia and UAE banks and higher in Oman banks.

3-4 Specification tests results

3-4-1 Matrix of correlation

The correlations between variables of the model are presented in the following matrix:

Table number (5): Matrix of correlations (Leverage risk is the dependent variable)

	Derivatives	Size	NIM	Constant
Derivatives	1.0000			
Size	-0.3510	1.0000		
NIM	0.1172	0.0509	1.0000	
Constant	0.1370	-0.8293	-0.5816	1.0000

Source: by the authors according to Stata 16 results

In addition, a test for multicollinearity is made using the variance inflation factor (VIF). The results are presented in the following table:

Table number (6): Multicollinearity test results of the fourth model

	VIF	1/VIF
Derivatives	1.16	0.858547
Size	1.15	0.868249
NIM	1.02	0.976621
Mean VIF	1.11	

Source: by the authors according to Stata16 results

The results show an absence of correlation between the independents variables since the variance inflation factors are less than 5.

Furthermore, the results of liquidity risk as the dependent variable are as follow:

Table number (7): Matrix of correlations (Liquidity risk is the dependent variable)

	Derivatives	Size	NIM	Constant
Derivatives	1.0000			
Size	-0.1318	1.0000		
NIM	0.1121	0.1086	1.0000	
Constant	-0.1039	-0.7120	-0.7500	1.0000

Source: by the authors according to Stata 16 results

Additionally, a test for multicollinearity is made using the variance inflation factor (VIF). The results are presented in the following table:

Table number (8): Multicollinearity test results of the fourth model

	VIF	1/VIF
Derivatives	1.03	0.966478
Size	1.03	0.967235
NIM	1.03	0.971956
Mean VIF	1.03	

Source: by the authors according to Stata16 results

The results show an absence of correlation between the independents variables since the variance inflation factors are less than 5.

The correlations between variables of the credit risk regression model are presented in the following matrix.

Table number (9): Matrix of correlations (Credit risk is the dependent variable)

	Derivatives	Size	NIM	Constant
Derivatives	1.0000			
Size	-0.3510	1.0000		
NIM	0.1172	0.0509	1.0000	
Constant	0.1370	-0.8293	-0.5816	1.0000

Source: by the authors according to Stata 16 results

A test for multicollinearity is also performed using the variance inflation factor (VIF). The results are presented in the following table:

Table number (10): Multicollinearity test results of the fourth model

	VIF	1/VIF
Derivatives	1.16	0.858547
Size	1.15	0.868249
NIM	1.02	0.976621
Mean VIF	1.11	

Source: by the authors according to Stata16 results

The results show an absence of correlation between the independents variables since the variance inflation factors are less than 5.

3-4-2 Heteroscedasticity test

The table (11) provides the results of heteroskedasticity test using Breusch-Pagan.

Table number (11): Breusch-Pagan Heteroskedasticity test results

Dependent variable	Chi 2(1)	P –value
Leverage risk	224.97	0.0000
Liquidity risk	13.78	0.0002
Credit risk	1.56	0.2114

Source: by the authors according to Stata16 results

From the above table, the results show the existence of heteroskedasticity problem according to the p-value of Breusch-Pagan test where it is less than 5% which means we reject the null hypothesis and accept the alternative hypothesis confirming the problem of heteroskedasticity in our model. In contrast, in the model where the dependent variable is credit risk, it is shown that there exists an absence of heteroskedasticity problem according to the p-value of Breusch-Pagan test where it is more than 5% which means we accept the null hypothesis and reject the alternative hypothesis confirming the homosckedasticity of our variables.

3-4-3 Endogeneity test

The next table represents the results of endogeneity test.

Table number (12): Endogeneity test results

Instruments		Chi-sq (1)	P-value
Leverage risk as the dependent variable			
Included	NIM	35.610	0.2300
Excluded	Size		
Included	Size	0.545	0.4604
Excluded	NIM		
Liquidity risk as the dependent variable			
Included	NIM	125.666	0.1020
Excluded	Size		
Included	Size	7.403	0.1065
Excluded	NIM		
Credit risk as the dependent variable			
Included	NIM	12.563	0.0004
Excluded	Size		
Included	Size	26.036	0.0000
Excluded	NIM		

Source: by the authors according to Stata 16 results

According to the results of table (12), for the first and second models, the p-value of the estimated regressions is higher than 5% which means that there is an endogeneity problem. In addition, the results of heteroskedasticity support the fact that we should run GMM model. Moreover, the number of banks sample (groups) is greater than the number of the time period. Hence, we can use GMM estimator in order to have better results of our regression. In contrast, the third model where the credit risk in the measure of accounting risk we use panel data analysis due to the absence of both heteroskedasticity and endogeneity problems.

3-5 Regression analysis

The table (13) represents the results of GMM regression results, where leverage and liquidity risk are used as a measure for accounting risk of banks.

Table number (13): Estimation outputs using GMM for (Leverage and liquidity risk as the dependent variable)

Variables	**Leverage risk**	**Liquidity risk**
leverage risk (-1)	0.119553 (22.72217)***	0.320813
Derivatives	6.11E-06 (0.033230)ns	(8.224498)***
Size	0.001594 (314.3676)***	-0.761069
NIM	-5.32E-05 (-181.7653)***	(-3.684927)***
Num of Obs	168	-0.042401
Hansen test (J-statistic)	24.23545	(-4.050368)***
P-value of Hansen test	0.281791	-0.035845
Arrellano & Bond test AR (1)	0.228854	(-10.51487)***
P-value of AR (1)	0.8190	192
Arrellano & Bond test AR (2)	0.747577	23.87955
P-value of AR (2)	0.4547	0.298931

Source: by the authors depending on Eviews 9 results

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

( ): t-statistic of the estimators.

Ns: not significant.

For leverage risk regression results, the p-value of Hansen J statistic is higher than 5% so we accept the null hypothesis that implies that the model is well fit and it confirms the validity of the instruments of our model. Additionally, the results of autocorrelation test of the error term show that the p value of the second order serial correlation AR (2) is higher than 5%. This finding implies that the original error term is serially uncorrelated therefore the moment conditions are correctly specified.

The significance of the dependent variable lagged value validates the application of the GMM model. Moreover the effect of derivative instruments is not significant on

leverage risk of banks. Moreover, the effect of bank size on leverage risk is positive and significant at 1% level of significance.

As concerning the variable net interest margin, it affects negatively the leverage risk of banks at level of significance equals to 1%.

Moreover, the liquidity risk regression findings show that the p-value of Hansen J statistic is higher than 5% so we accept the null hypothesis that implies that the model is well fit and it confirms the validity of the instruments of our model. Additionally, the results of autocorrelation test of the error term show that the p value of the second order serial correlation AR (2) is higher than 5%. This finding implies that the original error term is serially uncorrelated therefore the moment conditions are correctly specified.

Furthermore, the application of the GMM model is approved because of the significance of the lagged value of the dependent variable. The effect of derivative instruments is negatively significant on liquidity risk of banks at 1% level of significance. This means that using derivatives instruments in banks tends to reduce their liquidity risk. Moreover, the effect of bank size on liquidity risk is negative and significant at 1% level of significance. As concerning the variable net interest margin, it affects negatively the leverage risk of banks at level of significance equals to 1%.

As concerning the estimation results of the third model where the credit risk is the measure of accounting risk, the results are as follow:

Table number (14): Estimation outputs of the model

Independent Variable	**Method of estimation**			
	PLS	**FEM**	**DFE**	**REM**
C	4.009923 (4.163620)***	-11.93273 (-3.400941)***	-0.069655 (-0.010344)ns	0.553334 (0.370190)ns
Derivatives	6.571260 (0.500706)ns	-31.34830 (-1.869032)*	-21.44851 (-1.300029)ns	-30.46616 (-2.080993)**
Size	-0.607442 (-3.484482)***	2.566607 (3.636580)***	0.136105 (0.096221)ns	0.036111 (0.125834)ns
NIM	0.670382 (3.790788)***	1.210559 (5.441228)***	0.962938 (-2.813215)***	0.919839 (4.727836)***
Log likelihood	-414.4072	-341.4779	-322.9538	-
S.E	1.620198	1.232111	1.159825	1.282815
R^2	0.121641	0.548737	0.618975	0.113161
F statistic	9.924877***	8.602079***	8.212745***	9.144684***
DW	0.309950	0.640975	0.584776	0.486712
No of Obs	219	219	219	219
Hausman test				
Dependent variable total risk	**Chi 2 (3)**		**Prob < Chi 2**	
	21.842344		0.0001	

Source: by the authors depending on Eviews 9 results

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

( ): t-statistic of the estimators.

Ns: not significant.

In the PLS model, R square equals 12% which means that the independent variables explain only 12% of the dependent variable and the model is statically accepted at level of significance equals to 5% according to fisher statistic. The results show that the effect of derivatives on credit risk is not significant. The bank size affects negatively credit risk at level of significance equals to 1%. This revealed that the large the banks are the less credit risks they face. While, net interest margin effect on credit risk is positive at level of significance equals to 1%. This result means that the increase in banks performance leads to an increase in credit risks in banks.

The fixed model is accepted at level of significance equals to 5% according to fisher statistic, and R square has improved to 54%. The results show that derivatives instruments affect negatively credit risk in banks at level of significance equals to 10%, which means that the use of derivatives in banks for hedging purposes decrease their credit risks. For the bank size effect on credit risk, it is positively significant at 1% level of significance. This result reveals that the size of banks influences positively the risks. Hence, larger banks are riskier than small banks. As concerning net interest margin, its effect on credit risk remains the same positive effect at the same level of significance comparing to the previous model. Although R square in the DFE model is 61% and the model is statically accepted according to fisher statistic, the effect derivatives instruments and bank size on credit risk is not comprehensible and cannot be interpreted due to the insignificance of their coefficients, while the effect of net interest margin is positive and significant at 1% like the previous models.

The random effect model is statically significant according to fisher statistic and R square decreases to 11%. The effect of derivatives is negative on credit risk and significant at 5% level of significance, which means that using derivatives instruments decrease credit risk in our sample banks. Hence, their use is for hedging purposes. Moreover, net interest margin effect on credit risk is always positive and significant at 1% level of significance. For the variable bank size, its effect on credit risk is not clear.

From Hausman test, Chi square equals to 21.84 for the dependent variable credit risk and as the probability is less than 5% we reject the null hypothesis and accept the alternative hypothesis stipulating that the fixed effects models are the appropriate models.

CONCLUSION

Firstly, the estimation aims to determine the impact of derivative instruments on leverage risk of banks from GCC countries. For the effect of derivative instruments on leverage risk of banks in GMM estimation, it is not significant. Consequently, it appears that the theory stipulating that derivatives instruments are hedging tools and useful to reduce risks in banks is rejected.

Concerning the bank size effect on banks leverage risks, it is positive. This result corroborates the theory stipulating that the size of banks influences positively banks risks. The theory suggests that large banks are riskier than small banks. Moreover, net interest margin affects negatively leverage risks, meaning that the increase in the bank's

performance will decrease their leverage risk. This finding is not in line with the literature results.

Secondly, the estimation results of liquidity risk as a measure of accounting risks show that the effect of derivative instruments on liquidity risk of banks is negatively significant which is as expected and in line with literature results. Consequently, it appears that the theory stipulating that derivatives instruments are hedging tools and useful to reduce risks in banks is accepted.

In addition, the bank size effect on banks liquidity risks, it is negative. This result does not corroborate the theory stipulating that the size of banks influences positively banks risks. The theory suggests that large banks are riskier than small banks. Moreover, net interest margin affects negatively leverage risks, meaning that the increase in the bank's performance will decrease their leverage risk. This finding is not in line with the literature results.

Thirdly, the estimation results of credit risk as a measure of accounting risks can be summarized as follow: the derivatives instruments effect on banks 'credit risk is negative and significant. This finding supports the theory stipulating that using derivatives instruments decrease risks in banks and it corroborates the expectations stipulate that the derivatives instruments are hedging tools which are useful to reduce risks of banks.

Additionally, the effect of bank size on the credit risk of banks is not significant. This finding rejects the literature results stipulating that big banks are more risky than small banks size.

For the variable net interest margin, it affects positively the credit risk of banks which is in line with the theory and what it was expected comparing to literature results.

Lastly, concluding results suggest that the effect of derivatives instruments on both liquidity and credit risks in banks is negative. Hence, the finding supports the argument stipulates that derivatives usage reduce risks of banks. Hence, our hypothesis is accepted. As for the effect of derivatives on leverage risk, it is not comprehensible.

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