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The Effect of Financial Derivative use on the Performance of Commercial Banks: Empirical Study in GCC Countries during 2000-2013

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Abstract
The commercial banks are working on innovative ways to achieve profits instead of traditional methods, and hedging of systemic risks by using financial derivatives because of the uncertainty and high volatility in the global and domestic financial markets especially in Golf Cooperation Council "GCC" countries. In this paper we investigated the effect of financial derivatives use on the performance of commercial banks in the "GCC" countries, where the study included nineteen banks distributed among the countries (Bahrain, Emirate, Qatar and Saudi) during the period 2000-2013, using the regression model with unbalanced panel data. We concluded the acceptance of dual fixed effects model shows that the relationship varies from one bank to another, due to the different characteristics of each bank and each country. That the use of derivatives is working on the reduction of no systemic risks, which improves the performance of commercial banks especially in the crisis period.
Keywords: commercial banks, Banking Performance, GCC country, Panel data.
JEL Classification: C3; G32; M41.

1. Introduction

The Modern financial globalization policies played a major role in change the business environment for the banking industry (Rochdi 2012), which has increased the risk in general, especially after the abandonment of the Bretton Woods agreement. In emerging markets, commercial banks are working on innovative ways to achieve profits instead of traditional methods, and hedging of systemic risks by using financial derivatives because of the uncertainty and high volatility in the global and domestic financial markets. Financial derivatives witnessed an accelerated growth at the international level in recent years. The banking system has known instability under the mortgage crisis, the question remains about the existence of a relationship between the use of financial derivatives and the performance of commercial banks.

Derivatives have been associated with a number of high-profile corporate events that roiled the global financial markets over the last tow decades, to some critics; derivatives have an important role in near collapses or bankruptcies of Barings bank in 1995, long-term capital management in 1998, Enron in 2001, Lehman brothers and American international group in 2008. Warren buffet even viewed derivatives as time bombs for the economic system and called them financial weapons of mass detractions.

The GCC countries have the most important financial market in Middle East, when the use of financial derivatives has increased in the selected period, this growth can be explained by the dominance of financial derivatives markets by bank sector especially commercial banking in this countries.

The goal of this study is to examine the effect of financial derivatives using on the performance of commercial banks in the GCC countries during the period from 31-12-2000 to 31-12-2013 using the regression model with panel data. The rest of the paper is organized as follows. In section 2 we present the empirical literature review. Section 3 presents the model and the methodology. The results and discussion showed in section 4, and lastly, section 5 present the main conclusion.

2. Literature Review

There are many empirical studies investigating the relation between derivatives activities and commercial banks risk in order to measure the performance. REVAS A. and others (2006) investigate by the data envelopment analysis "DEA" model whether the use of derivatives by banks in Latin American (Brazil, Chile and Mexico) affect their efficiency using annual data during the period 2001-2002, the result indicates that the use of derivatives increases the efficiency of Latin American banks and the regulatory and the institutional constraints have a negative affect on efficiency of Latin American banks.

SHIU Y. and others (2008) examine by Probit model with panel data the determinants of derivatives

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usage and its impact of bank risk, using the quarterly data during the period 1998-2005 for all Taiwanese domestic banks listed on the Taiwan stock exchange. The result shows that risk management, informational and scale factors explain the use of derivatives and there are specific regulatory, legal and cultural environments that exist in Taiwan.

ZIADEH N. (2012) investigates the alternatives role of derivatives and credit derivatives contracts on US commercial banks (banks risks and banks failure). this author use a quarterly data over the period 2001-2010 and panel data, the result show that different type off balance sheet impact differently bank risk exposure, while better performance an all derivatives contracts including those held for non-trading purposes are assorted with an increase in risk exposure.

TITOVA Y. and al. (2012) are analyses the impact of derivatives on the banking risk for a sample of public banks from 19 countries over the period 2005-210 using annualized volatility of daily stock return to measure the banking risk, the result show that derivatives activity either has no impact on bank risk in the case of trading derivatives or leads to decrease bank risk in the case of hedging derivatives, and there are other factors influence on banking risk are size, loans quality, profitability and balance sheet items.

CHANG CH. And al. (2012) investigate by panel data the effect of derivatives use on measure of risk and value, using annual data for a sample of 218 listed commercial banks on 25 European countries, the result conclude that derivatives can increase banks risk if they are effectively used for hedging, and the use of derivatives is associated with bank market value.

ROCHDI M. and PERETTI CH. (2013) are purpose in here study is to assess the level of accounting risk via panel data that bank in both emerging and recently developed countries, using annual data cover the period from 2003 to 2010, the result of this investigation show that forwards negatively affect leverage risk, the use of swap contracts has negative effect on credit risk, the use of options generally increases risk and finally the use of futures minimally contributes to bank risk.

NOBUHISA and al. (2014) examine with panel data the effect of derivatives use on the risk level of Japanese banks for period covering one year 2010-2011, the result show that the usage of derivatives with hedging purpose reduce bank total risk and the demand for interest rate swaps is generally higher by banks with a higher ratio of the long term Japanese government bonds.

SHAN CH. and al. (2014) examine the effect of credit default swaps on bank capital adequacy and lending the behavior on US banks via the panel data, using annual data for the period of 2007-2009, the result show that credit default swaps using banks enjoyed better stock returns than their non-credit default swaps using, and regulatory capital regulation on the use of CDS enabled banks to mask their real capital adequacy as they became more aggressive in lending and more vulnerable to shocks.

4. Data and Methodology

4.1 Data

In our analysis we try to measure the effect of financial derivatives using by commercial banks. The main data source is BankScope database, we based from yearly balance sheets, income statements and financial ratios of 19 Commercial banks in four GCC countries namely: Saudi, Bahrain, Qatar and Emirates, over the period 2000-2013 (see table 1).

In this study we tested two hypotheses related to the impact of financial derivatives use on the performance of commercial banks in GCC, we formulate alternative hypotheses as follows:

- **H_0**: we can assume the usage of financial derivatives decreases the performance of commercial bank in GCC.
- **H_1:** we can assume the usage of financial derivatives increases the performance of commercial bank in GCC.

4.2 Econometric model

Panel data econometrics has evolved rapidly over the last decade (Bendob (2015)). For testing the effect of the derivatives use on performance of commercial banks, we used the unbalanced panel data for following linear regression model:

$$PER_{it} = \alpha + \beta DIR_{it} + \mu_i + \gamma_t + \varepsilon_{it} \quad (01)$$

Where

PER: is performance of bank i at time t, the performance of bank represent by CAMEL approach. The CAMEL is compose on the five indicators represented by factors (see bendob (2015)), this indicators acronym "CAMEL" and examined are as follows: (C): is capital Adequacy , (A) : is asset Quality, (M) : is management Efficiency, (E) : is earning or profitability and (L) : is liquidity. We chose four factors and each factor is represented by three financial ratios.

Capital adequacy or risk indicators, expressed by:

- ETOA: is Equity to Tot Assets ratio.
- ENL: is Equity to Net Loans ratio.

- ELIAB: is Equity to Liabilities ratio.

Asset quality indicators, expressed by :

- LLRGL: is Loan Loss Res to Gross Loans ratio.
- LLPNIR: is Loan Loss Provision to Net Interest Revenue ratio.
- ILE: is Impaired Loans to equity.

Earning or profitability indicators, expressed by :

- CIR: is Cost To Income Ratio.
- ROA: is Return on average assets, measured by net income to total assets ratio.
- ROE: is Return on average Equity, measured by net income to equity capital ratio.

Liquidity indicators, expressed by:

- NLT: is Net Loans to Tot Assets ratio.
- NTDSF: is Loan Loss Provision to Net Interest Revenue ratio.
- LADSF: is Impaired Loans to Gross Loans ratio

α , β : is Parameters of model, DIRit: is derivative value in asset of bank i at time t, μ_i : is unobserved Gross section Effects for individual i, γ_t : is unobserved gross period effects for period t, ε_{it} : is random variable representing the model residuals or errors term is *IID*.

5. Results and Comment

In table 02 we present the estimation results of derivative use and performance indicators of commercial banks in GCC countries with pooled least square "POLS". This table show that the relationship between DIVA and (profitability, risk and asset quality) is negative according to slope, and the model is insignificantly. Liquidity has a positive relationship with the independent variable (DIVA). The model is significantly different to zero at 5%. But are the result is different if we change the estimation method to fixed effect?

Table 03 show the result of the fixed effect cross, we observe that the indicators keep the same relation in the last estimation (POLS), but the model is statistically significantly different to zero at 5% level for all indicators of the GCC commercial banks and explanative according to adjusted-R; we can explain this result by, firstly with profitability, bank use the interest rate in the financial derivatives contracts, so the limit of this variable can reduce the profit of banks, secondly ; liquidity has a positive relationship with (DIVA), this result can be explained by the preferably of liquidity by banks in order to avoid the bankruptcy. The DIVA is negatively associated with asset quality, we can be explained by the bed quality of DIVA as an assets because banks can make difficulty the settlement of this contracts at the delivery date, finely; there is a negative relationship between DIVA and risk, can be explained by the hedging purposes for using DIVA, so the goal of this working on the reduction of risk.

Table 04 show the result of the dual fixed effects (Gross and Period), we observe that the performance indicators keep the same relation in the (FEC) and a reduction in the adjusted-R excepting the asset quality. The table 05 presents the random effect model of each indicator, the model is statistically significantly different to zero at 5% for liquidity and profitability excepting risk and asset quality. In order to make the differentiation between the fixed/random effects we present in table 05 the Hausman test witch conclude that the relation between the use of financial derivatives and performance indicators is a fixed effect not random according to Chi-square statistic, which different to zero.

Table 01 present the descriptive statistics of variables, which conclude that the Abu Dhabi commercial bank realizes a big average on the uses of financial derivatives, in other hand the Emirates NBD PJ have a high average in risk, can it be explained by the speculation purposes in the using of financial derivatives.

6. Conclusion

The usage of derivatives by Banks has been growing rapidly in past decades, as well as the increasing of instability of financial market system around the world. In this paper we use a new data containing GCC commercial banks operating 4 countries; we analyzed the effect of financial derivatives use on the performance of bank. For the simple regression with Panel data we find, that the use of derivatives does seem to decrease GCC banks risk, a possible explanation for this finding is that bank use derivatives to hedge risk changes not effectively to speculate, this result is also corroborated by a study of MOHAMMED ROCHDI ET CHRISTIAN DE PERETTI 2008.

Farther investigation revealed that the use of derivatives is positively associated with liquidity and negatively with asset quality. Especially we find hedging purposes for banks mainly causes an decrease in profitability, finely our estimation show that the effect of financial derivatives use by commercial banks follow the dual fixed effects model shows that the relationship varies from one bank to another, due to the different characteristics of each bank, each country and Period.

List of Tables

List of banks in the study and financial derivative use.

N and country	Name bank	APFDTA*
		1,52
	1. AHLI UNITED BANK	2,63
	2. ARAB BANKING CORPORATION	1,36
	3. BBK BSC	1,22
	4. GULF INTERNATIONAL BANK BSC	0,86
Emirates		**0,45**
	5. ABU DHABI COMMERCIAL BANK	0,78
	6. EMARATES BANK INTERNATIONAL	0,36
	7. EMARATES NBD PJ	0,47
	8. FIRST GULF BANK	0,59
	9. NATIONAL BANK OF ABU DHABAI	0,07
	10. NATIONAL BANK OF DUBAI	0,42
Qatar		**0,14**
	11. COMMERCIAL BANK OF QATAR	0,31
	12. DOHA BANK	0,06
	13. QATAR NATIONAL BANK	0,06
Saudi		**1,09**
	14. ARAB NATIONAL BANK	0,41
	15. BANK SAUDI FRANSI	2,41
	16. NATIONAL COMMERCIAL BANK	0,19
	17. RIAD BANK	0,88
	18. SAMBA FINANCIAL GROUP	1,66
	19. SAUDI BRITISH BANK	0,97

Source : authors.* APFDTA : Average percentage of financial derivatives value divided by total assets in the period of study.

Table 02 : Panel data regression estimate of the models of study with pooled least square for all indicators.

	Profitability			Liquidity		
	ROA ?	ROE ?	CIR?	NLT ?	NTDSF ?	LADSF ?
α	2.160*	17.135*	35.786*	53.810*	68.451*	26.923*
t-Statistic	17.817	15.577	34.481	51.897	42.457	24.015
β	-11.40 ns	-54.496 ns	-127.730 ns	401.957*	715.702*	-353.632*
t-Statistic	-1.168	-0.615	-1.528	4.815	5.514	-3.918
Adjusted R2	0.002	-0.003	-0.007	0.117	0.150	0.079
F-statistic	1.364 ns	0.378 ns	2.337 ns	23.190*	30.408*	15.353*
Prob(F-statistic)	0.244	0.539	0.128	0.000	0.000	0.000
	Risk			Asset quality		
	ETOA ?	ENL ?	ELIAB ?	LLRGL ?	LLPNIR ?	ILE ?
α	12.510*	23.897*	14.730*	3.148*	13.212*	14.932*
t-Statistic	34.310	29.642	28.560	16.656	6.272	9.054
β	-16.622ns	-	-27.462ns	-19.971ns	394.245**	-37.703ns
t-Statistic	-0.566	-2.766	-0.661	-1.312	2.325	-0.283
Adjusted R-squ	-0.004	0.038	-0.003	0.004	0.025	-0.005
F-statistic	0.320 ns	7.655*	0.437ns	1.722ns	5.405**	0.080 ns
Prob(F-statistic)	0.571	0.006	0.509	0.191	0.021	0.776

Source : authors. () t-Statistic, ns: Not Significant.. *, ** and *** Significant at1% , 5% , 10% level respectively.

Table 02 : Panel data regression estimate of the models of study with Fixed Effects (Cross)

	Profitability			Liquidity		
	ROA ?	ROE ?	CIR ?	NLT ?	NTDSF ?	LADSF ?
α	2.409*	19.396*	34.580*	55.533*	71.442*	25.689*
t-Statistic	22.524	18.231	48.691	61.504	55.313	24.015
β	-40.878*	-322.083*	14.989^{ns}	198.10*	361.77*	-207.62*
t-Statistic	-3.960	-3.136	0.218	2.273	2.902	-2.011
Adjusted R-squ	0.515	0.414	0.710	0.583	0.660	0.477
F-statistic	10.83*	7.53*	23.63*	13.90*	18.92*	9.43*
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000
	Risk			Assets quality		
	ETOA ?	ENL ?	ELIAB ?	LLRGL ?	LLPNIR ?	ILE ?
α	12.526*	23.413*	14.701*	3.128*	12.022*	15.626*
t-Statistic	33.160	25.960	27.405	15.223	4.719	8.889
β	-18.50^{ns}	-122.32 **	-24.04^{ns}	-17.68^{ns}	534.97**	-119.77^{ns}
t-Statistic	-0.507	-1.405	-0.464	-0.891	2.176	-0.706
Adjusted R-squ	0.328	0.250	0.323	0.266	0.112	0.288
F-statistic	5.51*	4.07*	5.41*	4.34*	2.16*	4.73*
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.006	0.000

Source : authors. () t-Statistic, ns: Not Significant.. *, ** and *** Significant at1% , 5% , 10% level respectively.

Table 03 : Panel data regression estimate of the models of study with dual Fixed Effects (Cross and period)

	Profitability			liquidity		
	ROA ?	ROE ?	CIR ?	NLT ?	NTDSF ?	LADSF ?
α	2.381	18.982	34.495	55.866	71.802	25.601
t-Statistic	21.343	17.183	47.025	59.371	52.404	23.007
β	-37.573*	-273.442*	25.069^{ns}	158.723***	319.149*	-197.24***
t-Statistic	-3.442	-2.527	0.349	1.724	2.404	-1.812
Adjusted R-squ	0.501	0.403	0.707	0.571	0.645	0.465
F-statistic	6.396*	4.619*	13.980*	8.152*	10.738*	5.665*
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000
	Risk			Asset quality		
	ETOA ?	ENL ?	ELIAB ?	LLRGL ?	LLPNIR ?	ILE ?
α	12.542*	23.371*	14.723*	3.008*	12.252*	14.837*
t-Statistic	31.708	24.938	26.222	15.387	4.744	8.492
β	-20.396^{ns}	-117.34***	-26.623^{ns}	-3.449^{ns}	507.76**	-26.425^{ns}
t-Statistic	-0.527	-1.280	-0.484	-0.180	2.010	-0.154
Adjusted R-squ	0.303	0.234	0.299	0.372	0.136	0.334
F-statistic	3.334*	2.638*	3.286*	4.173*	1.849*	3.696*
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000

Source : authors. () t-Statistic, ns: Not Significant.. *, ** and *** Significant at1% , 5% , 10% level respectively.

Table 04: Panel data regression estimate of the models of study with random effects (Cross)

	Profitability			Liquidity		
	ROA?	ROE?	CIR?	NLT?	NTDSF?	LADSF?
α	2.390*	18.976*	34.125*	55.277*	71.134*	25.869*
t-Statistic	10.802	10.109	15.864	28.628	22.834	12.998
β	-35.926*	-259.670*	4.855 ns	232.745*	413.209*	-236.743*
t-Statistic	-3.687	-2.743	0.072	2.813	3.456	-2.466
Random Effects cross						
Weighted Statistics						
Adjusted R-squ	0.070	0.037	-0.006	0.039	0.061	0.029
F-statistic	13.508*	7.468*	0.005 ns	7.896*	11.875*	6.090**
Prob(F-statistic)	0.000	0.006	0.941	0.005	0.0007	0.014
Unweighted Statistics						
R-squared	-0.030	-0.030	-0.004	0.101	0.127	0.075
	Risk			Asset quality		
	ETOA?	ENL?	ELIAB?	LLRGL?	LLPNIR?	ILE?
α	12.561*	23.658*	14.755*	3.120*	12.830*	15.422*
t-Statistic	20.681	19.602	17.249	10.517	4.864	5.813
β	-18.011 ns	-	-24.786 ns	-17.284 ns	459.56*	-82.857 ns
t-Statistic	-0.545	-1.944	-0.529	-0.987	2.405	-0.547
Random Effects cross						
Weighted Statistics						
R-squared	0.001	0.022	0.001	0.005	0.033	0.001
Adjusted R-squ	0.004	0.016	-0.004	-0.0001	0.028	-0.004
F-statistic	0.299 ns	3.793***	0.281 ns	0.977 ns	5.580**	0.298 ns
Prob(F-statistic)	0.585	0.053	0.596	0.324	0.017	0.585
Unweighted Statistics						
R-squared	0.001	0.042	0.002	0.010	0.030	-0.0002

Source : authors. () t-Statistic, ns: Not Significant.. *, ** and *** Significant at1% , 5% , 10% level respectively.

Table 05 : The Hausman test for the performance indicators

ROA ?		ROE?		CIR?	
Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.
2.104	0.146	2.458	0.116	0.430	0.511
NLT?		NLDSF?		LADSF?	
Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.
1.500	0.220	2.119	0.145	0.1004	0.751
ETOA?		ENL?		ELIAB?	
Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.
0.001	0. 974	0.289	0.590	0.001	0.973
LLRGL?		LLPNIR?		ILE?	
Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.	Chi-Sq. Statistic	Prob.
0.001	0.966	0.237	0.625	0.232	0.629

Source : authors.

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