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Evidence in the Islamic Banking Sector of the GCC Stock Market

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Abstract

This study examines the herding behavior in Islamic banking sector of the Gulf Cooperation Council countries (GCC countries). We examine in this paper the impact of the conventional banking sector on the herding behavior on Islamic banking sector. As well, we study the nexus between herding behavior and Islamic moral finance and economy. Based on daily data ranging from January 5, 2015, to September 4, 2023, and by using the methodology of Chang et al. (2000), we conclude the evidence of herding behavior at lower tail of the distribution. When we consider the possibility of existence of asymmetries between downward and upward market periods, we conclude that there is evidence of herding in Islamic banking sector only at the lower tail of the distribution during down market period. The study also shows the interdependencies between Islamic and conventional banking sector, and that the dispersion in conventional banking returns influence the Islamic banking returns. Also, we find that Islamic banking sector herd around conventional banking sector during down market period at upper tail only. This may be due to the non-confidence of investors in Islamic sector to rely on their decisions to the conventional banking sector. Finally, based on the DCC-GARCH model, we find a dynamic condition correlation between cross sectional absolute deviation CSAD and Islamic Financial Indicator in the short and long term.

Keywords: Herding behavior, Islamic GCC banking sector, Cross-Sectional Absolute Deviation, Quantile regression, Down and up market periods, Islamic Finance Indicator, DCC-GARCH model.

JEL Classification: G11; G41

1- Introduction

Modern finance theory highlighted the importance of investors' psychology in explaining fluctuations and anomalies in stock markets. Researchers are interested in the analysis of the behavior of investors according to different types of biases such as overconfidence, anchoring, mental accounting, emotional gap, herding, representativeness, self-attribution, etc. Herding which means follow the others in the market is considered as one of the most important biases which is analyzed and studied the irrational behavior of investors in GCC Islamic banking sector. Previous studies devoted to the analysis of herding behavior in developed, developing and emerging countries proved that this bias is detected and become more important during crisis, downturns, and high volatility periods where uncertainty becomes high and agents and deciders in the stock markets do not have the optimal solution and therefore decisions can be mistaken. Abnormal events, higher uncertainty, and high-tension periods will dampen herding and the behavior of investors will be, in most cases, different between down and up periods. In fact, during periods of crisis, investors tend to abandon their decisions about selling/buying stocks and decide to follow the crowd. Is this property will be the same for Islamic banking sector in GCC countries and does herding behavior will be affected by the Islamic moral economy and finance. As proved in many works analyzing conventional and Islamic stock markets, herding behavior in GCC countries will certainly be influenced by other factors such as oil price fluctuations, conventional stock market, policy economic uncertainty, market capitalization, etc.

Most studies on herding behavior insisted on the importance of asymmetric effects and studied the existence of herding behavior during extreme market periods. For example, Christie and Huang (1995) concluded in their seminal paper that US investors do not tend to follow the crowd even during extreme market movements and there is no evidence of herding in pricing US assets. Contrary to these findings, Chang et al. (2000) distinguished the evidence of herding behavior in both selected developing and developed markets while this bias was absent for other markets such as US and Hong Kong markets . Interested to the effects of herding behavior during crises, Lam and Qiao (2015) found the evidence of significant herding behavior in the Hong Kong equity market during Asian crisis (1997), Russian crisis (1998), and dot com technology bubble (2003). Similarly, Prosad et al. (2012) found the same result for the case of Indian equity market where herding behavior was concluded during periods of excess volatility and stress periods. When studying herding behavior for Saudi Arabia and

GCC countries in general, Balcilar et al. (2014), Ulussever and Demirer (2017), and Gabbouri et al. (2021) included the effect of oil price fluctuations on this bias. They concluded the importance of oil price movements in analyzing herding behavior.

Works continued to explain the importance of herding behavior during market stress periods. Recent years, some authors interested to the analysis of herding behavior in the Gulf region. Chaffai and Medhioub (2018) highlighted the evidence of herding behavior during up market periods in the GCC stock market. By considering the importance of oil sector in the GCC area, Medhioub and Chaffai (2021) included the effect of oil price fluctuations and dispersions on GCC stock market. Based on a sectoral analysis they found evidence of herding behavior during down and up market periods in the food and beverages sector while this behavior is confirmed in the banking and services sectors during down market periods only. Also, they highlighted that some sectors such as the insurance sector herd around oil returns during down market periods and that oil return dispersions have a dominant influence on the food and beverages sector during both downward and upward market periods. Ulussever and Demirer (2017), Medhioub and Chaffai (2021) and Gabbouri et al. (2021) included the effect of oil price fluctuations on this bias. They concluded the importance of oil price movements in analyzing herding behavior. For this reason, we examine the effect of oil price returns on Saudi stock markets during COVID-19 pandemic as we make comparison with the results obtained for the subperiod preceding this pandemic.

Recently, studies highlighted the statistically significant effect of external chocks such as economic policy uncertainty and investor's sentiment in the stock markets on herding behavior. For example, Lin and Li (2019) confirmed a positive relationship between economic policy uncertainty and herding behavior during high uncertainty regime corresponding to market stress periods. For our study we use the global Islamic economy index as a proxy to the Islamic moral economy and finance concept. This proxy can be a good indicator of Muslim investors beliefs and their moral economy and finance. Meanwhile, a high score of global Islamic economy index leads to high liquidity market periods which in turn lead to a high moral economy and finance period. While when the global Islamic score is low liquidity decreases in the market and a low moral economy and finance period is considered.

An in-depth analysis aimed at measuring herding patterns in bearish market conditions such as the outbreak of COVID-19 pandemic and drops in oil prices. Results confirm the evidence of non-linearity and asymmetry patterns in studying herding in Islamic

GCC banks intervals in the extreme up and down-market conditions. Meanwhile, investors in Islamic banking sector seem to take irrational decisions and decide to follow the crowd, especially during bearish periods. Our findings support the hypothesis that investors who trade in stocks would be more sensitive to the Islamic moral economy and finance and therefore herding will be more pronounced during periods of crisis. These results are in line with previous studies devoted to the analysis of herding such as those of Balcilar et al. (2013), Mobarek et al. (2014), Babalos et al. (2015), and Coskun et al. (2020) who detected evidence of herding behavior in stock markets during extreme market conditions.

The remainder of this paper is organized as follows. Section 2 briefly presents the herding behavior taking into account the impact of external factors like uncertainty, as we present crisis, oil price fluctuations, etc. Section 3 is devoted to the presentation of the data description and the empirical results. In section 4, we present the estimates of DCC-GARCH model to analyze the relationship between herding behavior and Islamic moral finance and economy. Finally, section 5 concludes the paper.

2- Herding modeling

Most of the works analyzing herding behavior, except those based-on surveys, used dispersion measures of returns as dependent variable and absolute and squared market returns as independent variables. Cross-sectional squared deviation of returns (CSSD) and cross-sectional absolute deviation of returns (CSAD) are considered as measures of dispersion. Christie Huang (1995) defined CSSD as follows:

$$CSSD_t = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(R_{i,t} - R_{m,t}\right)^2} \qquad (1)$$

Where, $R_{i,t}$ is the return of the stock price of company i at date t and $R_{m,t}$ is the stock market return at date t.

On the other hand, Chang et al. (2000) defined CSAD as follows:

$$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right| \qquad (2)$$

CSSD and CSAD are considered as proxy variables to the equity market herding that give an explanation to the rise and fall characterizing market returns during stress and boom periods from which herding can be tested. Nonlinearity is the main characteristic of irrational herding factor in the regression which can be reflected by a significant negative relationship between dispersion and square returns. In fact, the basic equation to analyze herding as developed by Chang et al. (2000) is expressed as follows:

$$CSAD_t = \beta_0 + \beta_1 \left| R_{m,t} \right| + \beta_2 R_{m,t}^2 + \varepsilon_t \qquad (3)^1$$

We confirm evidence of herding behavior when the estimated coefficient β_2 is negative and statistically significant. In other way, when β_1 is positive and statistically significant the dispersion of stock market returns increases at a slower rate (a decreasing rate of stock market returns).

After that, many works introduced other variables as explicative in the CSAD or CSSD model. As we said earlier, for the case of GCC countries, many papers interested to the analysis of herding behavior in the region, included the effect of some important factors on herding behavior such as variables related to the energy sector. For example, Ulussever and Demirer (2017), Balcilar et al. (2017), Medhioub and Chaffai (2021), Gabbori et al. (2021) and others included the impact of oil price fluctuations in analyzing herding behavior. In this context Balcilar et al. (2017) for example, concluded a significant relationship between speculation and rationality leading to less herding in the equity markets of oil-producing countries. Medhioub and Chaffai (2021) highlighted a significant impact of oil dispersion on herding behavior which differs among sectors and subperiods in the GCC stock markets.

Other studies highlighted that herding behavior could occur due to specific phenomena related to various market anomalies, such as information asymmetry, uncertainty, investor sentiment. Messaoud and Ben Amar (2024) found a negative and statistically significant impact of sentiment on herding behavior in the emerging stock market. They concluded that during downward market conditions a higher herding behavior was conducted from higher sentiment of investors in these markets.

Vedadi and Warkentin (2020) and Vedadi and Greer (2021) studied the impact of perceived uncertainty on herding behavior. They found a negative relationship between perceived uncertainty and the tendency to imitate others implying therefore that more is the uncertainty less are the investors likely to follow other investors in the market. Ngene and Gupta (2022) studied the effect of housing price uncertainty on herding on the UK housing market. Based on an experimental analysis they concluded that deciders in housing market should adopt strategies that minimize policy uncertainty as herding behavior increase asset mispricing and volatility in the market.

[1] The same equation can consider CSSD as a dependent variable.

Gul and Kan (2019) showed that the sentiment of investors can be a significant factor of herding behavior, and they highlighted that sentiment investor with higher decision accuracy tend to intensify herding in the Pakistani stock market.

Also, Medhioub and Chaffai (2018) studied the impact of conventional sector on the herding behavior in the Islamic stock market. In this paper, we follow the methodology of Medhioub and Chaffai (2018) to examine the herding behavior in the Islamic banking sector in GCC countries.

Also, in this paper we add to these variables the impact of Islamic moral economy and finance on herding. We considered therefore the following equation to model herding for the Islamic GCC banking sector:

$$CSAD_t = \beta_0 + \beta_1\left|R_{m,t}\right| + \beta_2 R_{m,t}^2 + \beta_3 CSAD_{conv,t} + \beta_4 R_{conv,t}^2 + \beta_5 IFI_t + \beta_6 Oil_t + \varepsilon_t \quad (4)^2$$

Where,

CSAD : Islamic banking cross sectional absolute deviation
CSAD_cov : Conventional banking cross sectional absolute deviation
$\left|R_{m,t}\right|$: Absolute Islamic banking market return
$R_{m,t}^2$: square Rmt
$R_{conv,t}^2$: square conventional market return
Oil_t: oil price return
IFI : Islamic Financial Index which is considered as a proxy to the Islamic moral economy and finance index

A significant positive coefficient β_3 indicates that the dispersion in the conventional banking returns impacts Islamic banking stock market returns and a significant negative coefficient β_4 implies that Islamic banking sector wide herd around conventional stock banking returns. Finally, a significant negative coefficient β_5/β_6 reduces the stock market return dispersion and increase therefore herding behavior bias, whereas a significant positive coefficient increases the dispersion of stock returns and reduces herding in the Islamic GCC banking sector. Because of asymmetries characterizing stock market returns, herding behavior can be analyzed separately among upward and downward market periods.

In this paper we use two different estimation methods to test whether IFI affects herding behavior in the GCC Islamic banking sector. The first method is the DCC-GARCH model to take into account the volatility characterizing time series, and to allow the possible dependence between GCC Islamic and conventional banking stocks over time.

[2] $CSAD_{conv,t}$ and $R_{conv,t}^2$ shall be determined in the same way as those of $CSAD_t$ and $R_{m,t}^2$, taking into account the conventional banking sector in the Gulf region.

As herding behavior is more deduced and interpreted by considering upper and lower tails where dispersions are in general instable, we employ a second method based on extremely low and high returns for both bullish and bearish periods. We consider the quantile regression analysis largely applied in works interested in the test of herding behavior.

3- Empirical results

3.1- Data and descriptive statistics

In this paper, we use daily data of Islamic and conventional stock-listed banks in GCC countries as provided by investing.com the period from January 5th, 2015, until September 4th, 2023. In terms of a herding measure, we consider the measure of Chang et al. (2000) who proposed a further developed measure of return dispersion called cross-sectional absolute deviation (CSAD). Chang et al. (2000) suggested that during periods of market stress, one would expect return dispersion (i.e., CSAD) and the market return (i.e., Rm) to have a nonlinear relationship.

Table 1 presents the descriptive statistics of the cross-sectional absolute deviation (CSAD) and the Saudi market stock return (Rm) for both Islamic and conventional banking sectors. As we present the descriptive statistics for the variables oil return and the Islamic Financial index which will be integrated in the model of herding behavior evaluation. Table 1 displays that the mean of CSAD is about 0.0098 and 0.00994 for Islamic and conventional GCC banking sectors respectively. The standard deviation corresponding to the variable CSAD Islamic banking sector is slightly higher than the standard deviation of conventional sector. In average, the Islamic banking return is smaller than the conventional banking return. Both CSAD variables are positively skewed, and their corresponding kurtosis are larger than 3 implying then that the CSAD distributions have a fatter tail on the right side for both Islamic and conventional banking sector. In average stock market return in Islamic sector is larger than that of conventional sectors. We can notice also that the stock return series are negatively skewed, and kurtosis statistics are larger than 3. Therefore, stock return distributions have fatter tails on the left side, indicating a lack of symmetry of the distribution for all series. Also, all series are characterized by heavy tails with extremely positive and negative values, indicating that the distributions are leptokurtic. We can conclude

therefore that the null hypothesis of normality is rejected in all series[3]. Finally, we conclude the stationarity property for all series since all ADF statistics are larger than the critical values at 1% significance level.

Table1. Descriptive statistics

	Islamic Banks		Conventional Banks		Control variables	
	CSAD	***Rm***	***CSAD***	***Rm***	***IFI***	***Oil***
Mean	0.0098	0.00478	0.00994	$-9.40\ 10^{-6}$	1.51522	-0.00105
Median	0.0088	0.00346	0.00891	0.00012	1.60000	0.00131
Maximum	0.111	0.0347	0.0525	0.03356	2.052220	0.376623
Minimum	0.0017	-0.0608	0.000949	-0.0676	0.70194	-3.05966
Std. dev.	0.0053	0.00707	0.005024	0.00632	0.35990	0.07827
Skewness	7.291	-1.528	1.911	-1.315	-0.59415	-30.1750
Kurtosis	124.03	15.239	10.0688	15.167	2.85588	1137.57
ADF	-6.721	-21.645	-9.364	-19.582	1.51522	-0.00105
Obs.	2113	2113	2113	2113	2113	2113

3.2- R*esults*

In this section we present the empirical results. As we said in the methodology, DCC-GARCH and quantile regressions according to different scenarios were considered. These scenarios were applied in line with the properties of the herding bias. For the results, we focus our attention on the sign and statistical significance of the estimated coefficients β_2 - β_6. Tables 2.a, 2.b , and 2.c present the regression results of Equations 3 and 4 for the full sample.

Table 2.a. Islamic banks herding estimation

CSAD	OLS	Quantile (10%)	Quantile (90%)
Constant	0.0071 [a]	0.004 [a]	*0.0112* [a]
$\lvert R_{m,t} \rvert$	0.497 [a]	0.502 [a]	*0.338* [a]
$R_{m,t}^2$	***6.853*** [a]	**-1.971** [b]	***26.899*** [a]
F-statistic (Quasi LR stat)	1020.78 [a]	440.92 [a]	646.76 [a]
R^2 (Pseudo R^2)	0.485	0.176	0.322

[3] Also, by calculating the Jarque Bera statistics for both series, we conclude that the null hypothesis of normality is rejected.

Table 2.b. Conventional banking sector impact on Islamic banking herding estimation

CSAD	OLS	Quantile (10%)	Quantile (90%)
Constant	0.00541 [a]	0.00319 [a]	0.0083 [a]
$\lvert R_{m,t} \rvert$	0.357 [a]	0.466 [a]	0.291 [a]
$R^2_{m,t}$	***15.449*** [a]	**-2.021** [a]	***28.036*** [a]
$Csad_{conv,t}$	***0.246*** [a]	***0.105*** [a]	**0.353** [a]
$R^2_{conv\_m,t}$	**-13.131** [a]	-0.239	**-12.198** [a]
F-statistic (Quasi LR stat)	658.52 [a]	462.05 [a]	701.301 [a]
R^2 (Pseudo R^2)	0.5489	0.19	0.356

Table 2.c. Impact of IFI and oil price on herding

CSAD	OLS	Quantile (10%)	Quantile (90%)
Constant	0.00587 [a]	0.00365 [a]	0.00857 [a]
$\lvert R_{m,t} \rvert$	0.356 [a]	0.471 [a]	0.323 [a]
$R^2_{m,t}$	***15.457*** [a]	**-2.097** [a]	***27.501*** [a]
$Csad_{conv,t}$	**0.245** [a]	**0.0981** [a]	**0.365** [a]
$R^2_{conv\_m,t}$	**-13.043** [a]	0.164	***-12.914*** [a]
IFI_t	-0.000304	-0.000261	-0.000291
Oil_t	0.00116	0.0011	**0.00271** [a]
F-statistic (Quasi LR stat)	439.102 [a]	466.351 [a]	662.489[a]
R^2 (Pseudo R^2)	0.551	0.191	0.356[a]

As we said previously, a negative and statistically significant estimated coefficient β_2 implies the evidence of herding behavior in Islamic banking GCC stock market. Therefore, according to tables 2.a., 2.b., and 2.c., herding is experienced in the extreme lower tail 10%, whereas an antiherding behavior is detected in the extreme upper tail 90%. Looking for the regression results shown in tables 2.b. and 2.c., we obtain a positive and statistically significant estimate of the coefficient β_3 for both extreme lower and upper tails indicating therefore evidence of a dominance of the conventional GCC banking sector on the Islamic GCC banking sector. In other words, the dispersion

of returns in conventional stock market increases the dispersion returns of the Islamic banking sector which tends then to an increase of fluctuations in the Islamic GCC banking sector.

Results show different behavior of investors between extreme lower and upper quantiles about the impact of the variable ($R^2_{conv,mt}$) on the dispersion of Islamic GCC banking sector. For the extreme upper quantile 90%, results show that the square conventional market return variable is negative and significant, whereas this coefficient is non-significant in the extreme lower tail 10%. These results indicate that the GCC Islamic banking market herd around the GCC banking conventional sector. Islamic banking market in GCC stock market is driven by the conventional GCC banking sector. We conclude therefore interdependencies between Islamic and conventional GCC banking sectors during high positive returns and during boom periods in the banking sector.

When we include the effects of Islamic Financial Index and the return of oil, we conclude a positive and statistically significant impact of oil return only in the extreme upper tail 90%. Fluctuations in the oil price tend to increase fluctuations in the Islamic banking sector.

After examining the herding for the full sample, we study herding behavior taking into account the property of asymmetry characterizing the Islamic GCC banking sector. We divide the full period in two subsamples the downward market period when the Islamic Banking sector return is negative; and the upward market period when the Islamic Banking sector return is positive. Results are presented in table 3 for lower and upper tails for both situations as normality hypothesis is rejected for both cases. In fact, the pattern of herding behavior during bullish and bearish market conditions, the following equations are employed:

$$\mathrm{CASD}_t^{DOWN} = \beta_0^{DOWN} + \beta_1^{DOWN}\left|R_{m,t}\right| + \beta_2^{DOWN}R_{m,t}^2 + \beta_3^{DOWN}CSAD_{conv,t} + \beta_4^{DOWN}R_{conv,t}^2 + \beta_5^{DOWN}IFI_t + \beta_6^{DOWN}Oil_t + \varepsilon_t \quad \text{When } R_{m,t} < 0 \qquad (5.1)$$

$$\mathrm{CASD}_t^{UP} = \beta_0^{UP} + \beta_1^{UP}\left|R_{m,t}\right| + \beta_2^{UP}R_{m,t}^2 + \beta_3^{UP}CSAD_{conv,t} + \beta_4^{UP}R_{conv,t}^2 + \beta_5^{UP}IFI_t + \beta_6^{DOWN}Oil_t + \varepsilon_t \quad \text{When } R_{m,t} > 0 \qquad (5.2)$$

The Quantile regression results of downward and upward market conditions as they are presented in Equations 5.1 and 5.2 are shown in table3.

Table 3. Conventional banking sector impact on Islamic banking herding estimation during down/up market periods

	Down market		*Up market*	
CSAD	Quantile (10%)	Quantile (90%)	Quantile (10%)	Quantile (90%)
Constant	.00471 [a]	.00949 [a]	.00407 [a]	.00869 [a]
$\lvert R_{m,t} \rvert$	0.475 [a]	0.181 [a]	0.467 [a]	0.736 [a]
$R_{m,t}^2$	-1.398 [c]	30.645 [a]	3.323	0.854
$CSAD_{conv,t}$	0.111 [a]	0.379 [a]	0.099 [a]	0.251 [a]
$R_{conv\_m,t}^2$	0.549	-13.763	-0.262	6.534
IFI_t	-0.000467 [c]	-0.000802	-0.000517 [c]	-0.00043
Oil_t	-0.000364	0.0023 [a]	0.0003	-0.00786
Quasi LR stat	369.462 [a]	493.788 [a]	258.441 [a]	336.955 [a]
Pseudo R^2	0.201	0.428	0.207	0.307

We can show from table 3 that we obtain different results with the quantile levels. We distinguish evidence of herding behavior in Islamic banking sector at lower tail 10% for down market period only. An anti-herding behavior was detected during this stressful period at upper tail. There is no evidence of herding during up market periods at both lower and upper tails. Therefore, in stressful periods in case of lower values of returns, losses in Islamic banking sector are high, the market does not work well, and investors do not believe in their own decisions and tend to follow the others in the market. Also, an important result concern the impact of conventional banking sector on the herding in the Islamic banking region in the Gulf region. We obtain a positive and significant estimated coefficient β_3 for all cases implying then that the dispersion in conventional banking returns influences the Islamic banking returns. Meanwhile, a dominance of the conventional banking sector around the Islamic banking one can be concluded. In terms of the estimated coefficient β_4, we notice that this coefficient is not significant during downward and upward market conditions implying then that Islamic banking sector do not herd around conventional banking sector. The Islamic Financial Index considered as a proxy to the Islamic moral finance and economy indicates a negative and significant statistically impact on the cross-sectional average of dispersion in the extreme lower tails of both downward and upward market periods. This means that investors are likely to herd and follow the crowd during lower tails at both down and up market periods. Finally, results confirm the evidence of asymmetries between

down market and up market conditions. These results are in line with the works of Balcilar and Demirer (2013), Balagyozyan and Cakan (2016), Bouri et al. (2020), and Medhioub and Chaffai (2021), etc.

4- DCC-GARCH estimates of herding

In this section, we use the Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroscedasticity (DCC-GARCH) model as proposed by Engle (2002) and Engle and Sheppard (2001) to measure the interaction effect between herding and Islamic Financial Index in the Islamic GCC banking sector. We consider the following model:

$$h_t = D_t R_t D_t$$

$$R_t = diag(Q_t)^{-1/2} Q_t diag(Q_t)^{-1/2}$$

$$Q_t = \left(q_{ij,t}\right) = (1 - \alpha - \beta)S + \alpha \epsilon_{t-1} \epsilon'_{t-1} + \beta Q_{t-1}$$

$$D_t = diag\left\{\sqrt{h_{i,t}}\right\}$$

$$\rho_{ij,t} = q_{ij,t} / \sqrt{q_{ii,t} q_{jj,t}} \qquad (6)$$

Where, R_t represents the time-varying correlation matrix

D_t: A diagonal matrix of the time varying standard variation from the univariate GARCH process.

Q_t: A positive definite matrix of order 2.

S: A covariance matrix of order 2.

α and β are two non-negative coefficients of the DCC-GARCH model such that $\alpha + \beta < 1$, and $\rho_{ij,t}$ is the dynamic correlation estimator.

According to equation (6), we examine the transmission of shocks between the variable of dispersion CSAD of Islamic GCC banks from one side, and the independent variables Islamic Financial index, oil price fluctuations and GCC conventional banks from the other side. For doing this, we estimate the bivariate dynamic coefficient of correlations between each pairwise of independent variables and the dependent variable. Table 4 shows the results of the estimation of equation (6).

Table 4. DCC-GARCH estimation

	IFI	Oil price	CSAD_Conv
C_{11}	0.00182[a]	0.00521[a]	0.00644[a]
α_{11}	0.705[a]	0.873[a]	0.782[a]
β_{11}	0.079[a]	0.0463[a]	0.0354[a]
C_{22}	0.000319	0.000461[b]	0.0000648
α_{22}	0.135[b]	0.172[a]	0.289[a]
β_{22}	0.811[a]	0.831[a]	0.697[a]
α	0.162[a]	0.0746[a]	0.0711[a]
β	0.784[a]	0.911[a]	0.833[a]

From table 4, we distinguish a positive and significant estimated coefficient α for each estimation which implies the evidence for all of a dynamic conditional correlation in the short term between Islamic moral finance and economy, oil price fluctuations and the dispersion of GCC conventional banks and herding behavior in the Islamic GCC banking sector. As well, the estimated coefficient β is positive and statistically significant for all estimations indicating therefore that, in the long term, the dynamic conditional correlations between these independent variables and herding in the Islamic GCC banking sector persist. The sum of the estimated coefficients α and β for all estimations is less than one indicating then that the dynamic conditional correlations are mean reverting and that the DCC-GARCH model is a best fitting model.

Figure1 shows the time varying correlations between Islamic Financial index, oil price and dispersion of conventional banks and Islamic CSAD banks. From these graphs we can distinguish that correlations switch from positive to negative values with a long-term persistence. Therefore, we conclude time varying behavior exhibiting these correlations which can have significant implications for herding of investors in the Islamic banking sector.

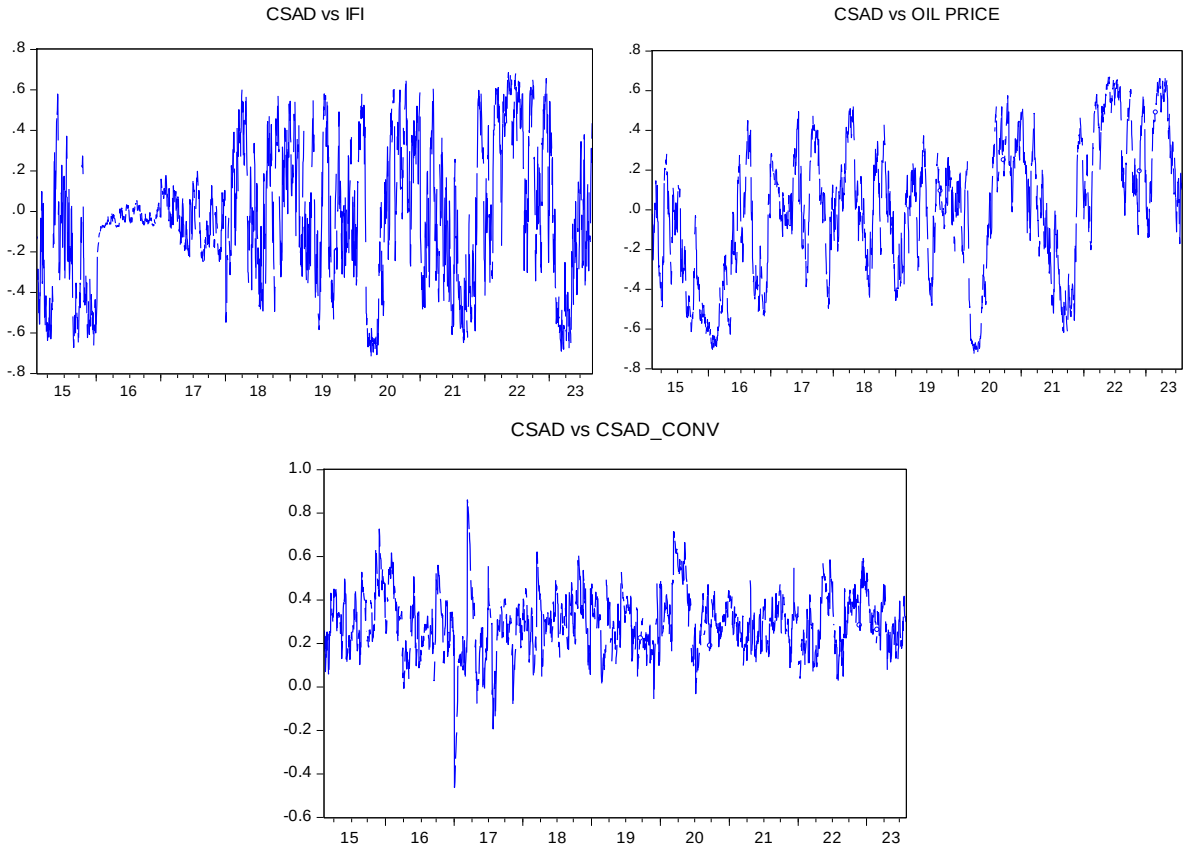

Figure1. DCC dynamic correlations

These findings are consistent with the previous results of (Gouta and Ben Mabrouk, 2024) devoted to the analysis of the relationship between spillover effects in G7 and BRICS stock markets, and the herding behavior by using DCC-GARCH model. They conclude positive and statistically significant DCC coefficients confirming the persistence in the short- and long-term persistence with an advantage for the long term.

5- Conclusion

Herding behavior is one of the most studied biases in recent years in the field of behavioral finance theory, as investors try to follow the others in the market especially during stress periods. This paper focuses on the herding behavior in one of the most important sectors in the GCC countries which is the Islamic banking sector. Based on daily data for Islamic and conventional banks in the GCC countries for the period January 1, 2015, till September 4, 2023, and following the methodology of Chang et al. (2000) we examined the non-linear relationship in the extreme price movements during down and up market periods via quantile regression analysis in a first step, and the use of DCC-GARCH model estimation in a second step. Results show the evidence of asymmetries between bull and bear periods from one side, and between low and upper tails of the distribution on the other side when analyzing herding behavior in Islamic

banking sector of the GCC countries. We found that there is evidence of herding behavior during down market period at the lower tail 10% of the distribution only.

Also, results show the dominance of conventional banking sector on the Islamic sector in the region and the interdependencies between both sectors. Dispersion in the conventional banking sector significantly increases the dispersion in the Islamic banking sector for all cases. As we conclude that during up market periods, investors in the Islamic banking sector do not follow the crowd and decide to take their own decisions and make rational investment.

On another side, and according to the DCC-GARCH model to well analyze the relationship between herding behavior and Islamic moral finance and economy, as we examine the impact of oil price fluctuations and the dispersion of conventional banking sector on herding behavior in the GCC Islamic banking sector. We conclude statistically significant dynamic conditional correlations between these factors in the short and the long term. Additionally, we conclude a time varying behavior exhibiting the correlations between all these factors which can have significant implications for herding behavior in Islamic stock markets in general.

Our findings support the hypothesis that investors who trade in stocks would be more sensitive to the Islamic moral economy and finance and therefore herding will be more pronounced during periods of crisis. These results are in line with previous studies devoted to the analysis of herding such as those of Balcilar et al. (2013), Mobarek et al. (2014), Babalos et al. (2015), and Coskun et al. (2020) who detected evidence of herding behavior in stock markets during extreme market conditions.

Future research can analyze how uncertainty and geopolitical news can affect herding behavior in the GCC stock markets.

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