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Tadawul Resilience Amidst Global Financial Crises: A Comprehensive Study

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ABSTRACT
This research investigates the resilience of TADAWUL, the Saudi Arabian stock market, amidst global financial crises by examining trends before and after the global financial crisis. It assesses the impact of global financial crises on TADAWUL volatility and explores TADAWUL's resilience mechanisms during global financial crises. This study also aims to identify key determinants of TADAWUL volatility. The methodology involves a comprehensive approach, integrating descriptive analysis, unit root testing, and GARCH modeling. Findings of the study reveal significant positive skewness, indicating outliers impacting volatility. The GARCH (1,1) model demonstrates the substantial influence of stock returns on current returns. The research provides detailed perspectives that can be valuable for investors and future researchers, navigating the intricate landscape of the Saudi Arabian stock market.

Keywords: *TADAWUL, Global financial crises, Volatility, Resilience mechanisms, Stock market trends, GARCH modeling*

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I. INTRODUCTION

A "financial crisis" often indicates a time of significant financial system disruption, which is often accompanied by a sharp decline in asset prices, widespread bank failures, and a slowdown in economic activity where there is a lack of liquidity for financial institutions when consumers and businesses are unable to pay their debts. Financial crises can have a variety of underlying causes and manifest themselves at local, national, or even global scales.

The global financial markets were significantly affected by the financial crisis that started in 2007, referred to as the Global Financial Crisis (GFC) or the Great Recession. It's crucial to remember that the collapse of the US subprime mortgage market was a major contributing factor to the crisis. Tadawul, the official stock exchange of Saudi Arabia, suffered significant turmoil during the financial crisis. It experienced substantial drops in the value of its listed equities, which were a reflection of the general slump in the world's financial markets. However, due to its modest exposure to the toxic mortgage-backed securities that caused the crisis, Saudi Arabia's economy was largely protected from the crisis' direct effects. During this time, Saudi Arabia also profited from higher oil prices, which lessened the burden on its economy.

It's important to note that although Tadawul had a drop during the crisis, it eventually rebounded, along with other international markets, as governments and central banks took action to stabilize the financial system and promote economic recovery.

II. LITERATURE REVIEW

Understanding stock market volatility and its transmission, for market players such as individual investors, institutional investors, traders, and portfolio managers, there is a substantial challenge, especially following a big financial crisis, between emerging and mature markets. When making investing decisions and in times of crisis, they are cognizant of systemic risk and portfolio losses.

In a study Azra Zaimovic & Lejla Dedovic investigates the government reactions to the 2020 global financial crisis (GFC) and the COVID-19 pandemic, concentrating on the US and China. It examines the magnitude, scope, structure, and timing of their policies and how they affect the S&P 500 and SSEC stock market indices. The data shows that governments are responding more quickly and effectively to the COVID-19 issue, with increased volatility in the World Index of the Dow Jones Islamic Market. This suggests that Islamic finance could address economic unrest by funding infrastructure projects privately using shariah-compliant instruments.(Zaimović & Dedovic, 2021)

In a study, Jannis Bischof, Christian Laux, and Christian Leuz investigate the banks' loss recognition and disclosure practices during the financial crisis, revealing key problems with the relationship between accounting and financial stability. Banks' disclosures of risk exposures were scarce before the situation, and realizing loan losses took longer than anticipated. The study suggests that protecting regulatory capital obtained by applying prudential filters to accounting losses could reduce these obstacles.(Bischof et al., 2021)

Walid Mensi Conducted a study that examines portfolio risk management and the dynamic co-movements between the Saudi stock market and crude oil using the wavelet technique and value at risk metric. It reveals significant cross-frequency and time co-movements, particularly after the global financial crisis of 2008-2009. Sectors of petrochemicals are most influenced by oil price upwards, while other sectors like banking, agriculture, and telecommunications have not been affected. The study's dynamic and accurate Value at Risk analysis is significant for investors and decision-makers.(Mensi, 2019)

Khalafalla Ahmed Mohamed Arabi in his study investigates the variables influencing the Tadawul All Stock Index (TASI) of the Saudi Stock Market between 2005 and 2017. The Autoregressive Distributed Lag model (ARDL) and Bounds test show no long-run association. However, price-earnings ratio, nominal effective exchange rate, money supply, and long-term credit have significant long- and short-run relationships with TASI. News significantly affects volatile stock market returns, with a shorter GARCH period suggesting a quick dissipation of shocks.(Arabi, 2018)

Simon Grima& Luca Caruana in their study sought to ascertain how the 2008 Financial Crisis affected the BRIC countries' stock market performance. It used a regression analysis to examine the correlation between BRIC stock market returns and U.S. stock markets. China Security Index (CSI300), MICEX (Russia), NIFTY (India), and BOVESPA (Brazil) were among the dependent variables. The findings demonstrated that the BRIC nations were impacted by the financial crisis, with the S&P 500 index of the US stock market included as a benchmark variable.(Grima & Caruana, 2017)

An international financial integration index for GCC stock markets is developed by Abdullah R. Alotaibi and Anil V. Mishra using a time-varying market integration international asset pricing model and the DCC-GARCH technique. The index is positively impacted by trade openness, financial market development, turnover, and oil revenue, according to the results, while the global financial crisis negatively affects it. This has implications for GCC market policy.(Alotaibi & Mishra, 2017)

Ahmed Banafe & Rory Macleod in their study observes that the global financial crisis began after the Saudi Tadawul stock market crash, leading to budget surpluses, government debt repayments, and increased foreign exchange reserves. The non-oil economy struggled to diversify, and in 2016, Vision 2030 was unveiled. The banking system remained largely unaffected by the crisis, leading to the bankruptcy of Saad-AHAB and the creation of mortgage markets. Government debt was issued again after the oil price drop, resetting devaluation schedules.(Banafe & Macleod, 2017)

Pedro Antonio Martin-Cervantes& Salvador Cruz-Rambaud in a study dates-stamped the Tadawul Bubble, a large financial bubble in Saudi Arabia in 2006, using analysis from 10/1998-4/2017 and econometric tests. Two smaller "micro bubbles" with lower incidence occurred in 2014, indicating that the Tadawul Bubble likely resulted from a technological bubble that burst a year earlier than most global financial markets, but had more violent effects on Saudi Arabia's financial markets. (*EB-20-V40-I2-P127.Pdf*, n.d.)

Hassan B. Ghassan & Stefano Fachin argues that Islamic banks, characterized by their adherence to Islamic principles, were not found to fail during the 2008-2009 financial crisis. However, there is no consensus on whether Islamic banks are more or less stable than regular banks. A study using quarterly data from Saudi banks revealed that individual heterogeneity may matter more than the conventional or Islamic nature of the banks. The study found that Islamic banks had a positive impact on the system's stability, particularly when focusing on the largest banks. This highlights the need for more research on the stability of Islamic banks in Saudi Arabia.(Ghassan & Fachin, 2016)

Quang Viet Vu and Kimberly F. Luchtenberg investigate the reasons for worldwide contagion during the 2008 financial crisis, analyzing both uni- and bi-directional contagion using a global sample of returns from 2003 to 2009. It finds that cross-market links increase across financial markets, and the crisis spread beyond emerging markets, with developed markets like the US spreading contagion. The study also reveals that international contagion is influenced by investors' risk aversion and economic elements like industrial production, interest rates, inflation rates, trade structure, and regional implications.(Luchtenberg & Vu, 2015)

In research published in 2008, Hela Miniaoui, Hameedah Sayani, and Anissa Chaibi compare the performance of conventional and Islamic indexes in the Gulf Cooperation Council (GCC) nations. It uses data from Six GCC marketplaces and the Dow Jones Islamic Market Index GCC. The financial crisis had an impact on Bahrain's mean returns, according to the results, but volatility only had a major impact on three GCC markets: Kuwait, Bahrain, and the UAE. The volatility of the Islamic index was not less than that of the conventional indices.(Miniaoui et al., 2015)

The GJR GARCH model is utilized in this work by P. Sakthivel, K. Veera Kumar, G. Raghuram, K. Govindarajan, & V. Vijay Anand to examine the effect of the global financial crisis on stock market volatility. It covers two time periods Pre-crisis years 2005–2008 and post–crisis years 2008–2012. A dummy variable is added to show the impact of crises on stock return volatility. Results show that mean returns were more unstable in comparison to the pre-crisis period in the post-crisis period.(Sakthivel et al., 2014)

A study by Mohd I. M. Alnajjar explores irrational investment behavior in Tadawul using a psychological decision-making model. Results from 119 Tadawul investors show a strong correlation between risk perception and return expectations, with information asymmetry and risk perception being inversely correlated. Reinvestment intentions, investment success, and risk satisfaction have negative correlations with risk perception.(Alnajjar, 2013)

In an analysis, Muhammad Afzal and Rafaqet Ali forecasts the effects of the global financial crisis on Pakistan and India's stock markets using data from the KSE-100 and BSE-100 indexes from 2003 to 2010. Results show that negative shocks have a greater impact on volatility than positive shocks, and continuous volatility clustering affects these markets. The Indian stock market had a more significant effect.(Ali & Afzal, 2012)

In a paper Raditya Sukmana & Sutan Emir Hidayat argues that the global financial crisis has affected the European regions and the GCC, affecting Islamic and conventional stock indices. This study examines the preparedness of these indices and provides investment guidelines. The crisis's impact varies across countries, with countries not exposed to its sources having less impact. Bahrain is significantly impacted due to excessive exposure to foreign banking and real estate sectors.(Sukmana & Hidayat, 2012)

It was observed that Saudi Arabia was affected by the global financial crisis in spite of its robust economy, macroeconomic elements such as countercyclical fiscal and banking system policies, a robust regulatory framework, and sound economic circumstances. Major reason for this could be crash in Stock and commodity prices due to a lack of investor trust in bank soundness and a reduction in the availability of credit.

III. OBJECTIVES

Taking into account the existing literature, which emphasizes the critical role that financial markets play during global economic turmoil, our study aims to explore TADAWUL's performance during times of global financial crisis. Throughout the literature, resilience and adaptive mechanisms have been highlighted in relation to stock market responses to crises. However, a comprehensive analysis of TADAWUL's resilience during such periods has yet to be conducted. In order to fill this gap, our research proposes specific objectives that aim to;

examine trends of Tadawul before and after global financial crisis.

assess the Impact of Global Financial Crises on TADAWUL Volatility

examine TADAWUL's Resilience Mechanisms During Global Financial Crises

identify Key Determinants of TADAWUL Volatility

IV. METHODOLOGY

To investigate TADAWUL's resilience amidst global financial crises, we employ a multifaceted methodology that integrates descriptive statistics, unit root testing, and GARCH modeling. A thorough analysis of the TASI Index through descriptive statistics provides valuable insight into the market's characteristics. In the following step, we perform a unit root test to assess the stationarity of the data series. We then explored our study's main findings by employing Generalized Autoregressive Conditional Heteroskedasticity (GARCH). By using this model, we can capture and analyze the volatility patterns inherent in the TASI Index, especially during global financial crises. Further, diagnostic checks following the GARCH model's estimation, validated our findings. With this comprehensive methodology, we aim to not only quantify the impact of crises on TADAWUL's volatility, but to identify key determinants and mechanisms that contribute to the market's resilience.

V. DATA SET

Table: 1
Tadawul All Share Historical Data (2005-2023)

Time period	TASI Index	Time period	TASI Index	Time period	TASI Index	Time period	TASI Index
Q1,2005	9275.81	Q4,2009	6248.71	Q3,2014	10727.21	Q2,2019	8880.813
Q2,2005	12240.33	Q1,2010	6497.02	Q4,2014	8997.703	Q3,2019	8281.383
Q3,2005	14358.73	Q2,2010	6360.75	Q1,2015	8990.317	Q4,2019	7997.457
Q4,2005	16213.47	Q3,2010	6260.847	Q2,2015	9536.69	Q1,2020	7460.093

Q1,2006	18461.25	Q4,2010	6431.043	Q3,2015	8008.293	Q2,2020	7183.34
Q2,2006	12463.37	Q1,2011	6287.503	Q4,2015	7092.163	Q3,2020	7899.663
Q3,2006	11123.3	Q2,2011	6674.18	Q1,2016	6104.067	Q4,2020	8448.113
Q4,2006	8658.537	Q3,2011	6161.267	Q2,2016	6584.713	Q1,2021	9251.787
Q1,2007	7688.78	Q4,2011	6248.863	Q3,2016	6001.673	Q2,2021	10651.45
Q2,2007	7317.9	Q1,2012	7244.337	Q4,2016	6740.943	Q3,2021	11275.9
Q3,2007	7825.667	Q2,2012	7081.217	Q1,2017	7025.293	Q4,2021	11249.22
Q4,2007	9635.787	Q3,2012	6952.343	Q2,2017	7103.477	Q1,2022	12650.83
Q1,2008	9566.187	Q4,2012	6708.467	Q3,2017	7211.94	Q2,2022	12726.29
Q2,2008	9649.273	Q1,2013	7055.87	Q4,2017	7054.887	Q3,2022	11962.58
Q3,2008	8318.76	Q2,2013	7360.163	Q1,2018	7646.597	Q4,2022	11014.39
Q4,2008	5026.317	Q3,2013	7882.18	Q2,2018	8228.047	Q1,2023	10495.22
Q1,2009	4632.413	Q4,2013	8301.783	Q3,2018	8080.873	Q2,2023	11260.29
Q2,2009	5705.103	Q1,2014	9113.627	Q4,2018	7812.243	Q3,2023	11413.13
Q3,2009	5920.357	Q2,2014	9640.547	Q1,2019	8624.03	Q4,2023	11013.86

Source: www.Investing.com
(*TASI Historical Rates (TASI) - Investing.Com*, n.d.)

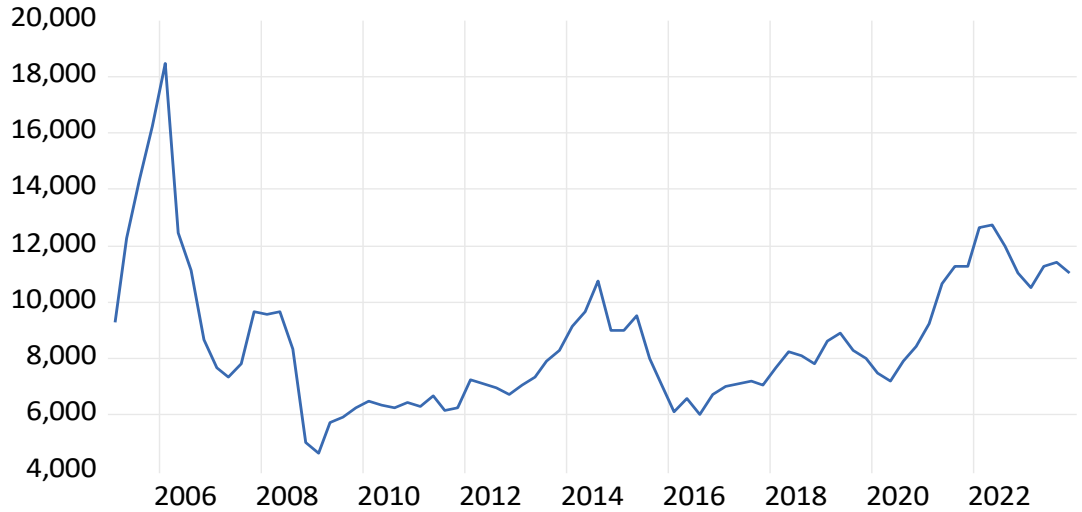

Figure 1: Trends of Tadawul before and after global financial crisis
Source: www.Investing.com
(*TASI Historical Rates (TASI) - Investing.Com*, n.d.)

VI. RESULTS AND ANALYSIS

Table 1 is showing 19 years quarterly data collected from website of financial markets platform, Investing.com, that provides real-time data, quotes, charts, financial tools, breaking news and analysis across 250 exchanges around the world in 44 language editions. This raw data is showing a trend which is evident in figure 1. For analyzing the dynamics more scientifically we applied statistical tests systematically on our gathered data.

Descriptive Statistics

This study commences with a detailed analysis to understand the fundamental characteristics and patterns within the dataset. Findings from Figure 2 indicate the skewness value of 1.36 suggests that the distribution of the data is positively skewed to the right, meaning that the tail on the right side of the distribution is longer or fatter than the left side. In practical terms, this implies that there may be outliers with higher values in the dataset, pulling the mean in the direction of the longer tail. A kurtosis value 5.43, which is above 3 suggests a leptokurtotic distribution, indicating more extreme values concentrated around the mean. Jarque-Bera test p-value 0.00000 indicates significant deviation from a normal distribution and adherence to normality (Khan & Panjwani, 2021).

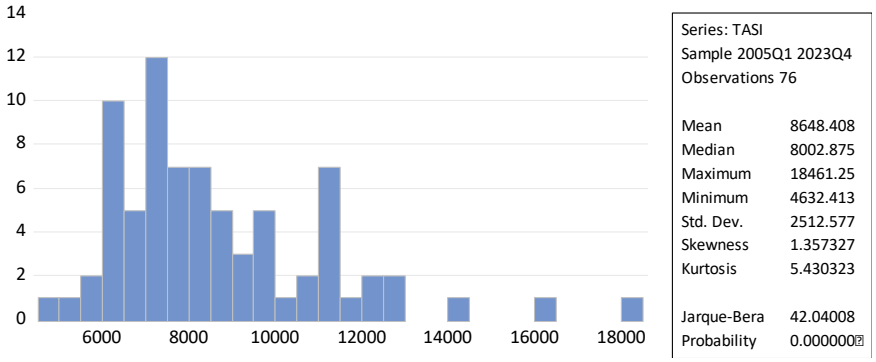

Figure 2: Descriptive Statistics applied on Table 1
Source: E-Views results

Unit Root test

We conducted Augmented Dickey-Fuller test to evaluate the stationarity of the TASI Index time series. We applied differencing technique and checked result's significance on level. Here p value of ADF is 0.0442 (Table 2), which is significant. That means our data is stationary at level (Khan & Mihaisi, 2022). Our first Diagnostic test is accomplished here.

Table 2: E-Views Results of Unit root test

Null Hypothesis: TASI has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.953612	0.0442
Test critical values:	1% level	-3.521579	
	5% level	-2.901217	
	10% level	-2.587981	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TASI)
Method: Least Squares
Date: 12/12/23 Time: 11:10
Sample (adjusted): 2005Q3 2023Q4
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TASI(-1)	-0.152974	0.051792	-2.953612	0.0043
D(TASI(-1))	0.315154	0.107834	2.922596	0.0047
C	1291.117	462.4722	2.791773	0.0067

R-squared	0.162120	Mean dependent var	-16.57392
Adjusted R-squared	0.138517	S.D. dependent var	1165.880
S.E. of regression	1082.124	Akaike info criterion	16.85094
Sum squared resid	83140460	Schwarz criterion	16.94434
Log likelihood	-620.4846	Hannan-Quinn criter.	16.88820
F-statistic	6.868814	Durbin-Watson stat	2.202644
Prob(F-statistic)	0.001875		

Heteroskedasticity test

As part of the GARCH modeling process, the heteroskedasticity test assesses whether residuals show a constant variance over time or if there are patterns of changing variance over time. The test is used to evaluate whether the GARCH model adequately captures the volatility dynamics in time series data. In Table 3 a heteroskedasticity test with a p-value of 0.0012 indicates strong evidence to reject the null hypothesis of constant variance in the residuals. Results show that there is ARCH effect or volatility in the data.

Table 3: E-Views Results of Heteroskedasticity test

Heteroskedasticity Test: ARCH

F-statistic	11.39659	Prob. F(1,72)	0.0012
Obs*R-squared	10.11250	Prob. Chi-Square(1)	0.0015

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/12/23 Time: 11:17
Sample (adjusted): 2005Q3 2023Q4
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	766227.7	395878.2	1.935514	0.0569
RESID^2(-1)	0.357358	0.105856	3.375884	0.0012

R-squared	0.136655	Mean dependent var	1260459.
Adjusted R-squared	0.124664	S.D. dependent var	3381860.
S.E. of regression	3164047.	Akaike info criterion	32.79926
Sum squared resid	7.21E+14	Schwarz criterion	32.86153
Log likelihood	-1211.573	Hannan-Quinn criter.	32.82410
F-statistic	11.39659	Durbin-Watson stat	2.212110
Prob(F-statistic)	0.001189		

GARCH Modeling

The GARCH(1,1) model results indicate a significant impact of stock exchange returns on current returns, as evidenced by the low p-value (0.0000) in the mean equation (Table 4). Furthermore, the coefficient value of 0.921 indicates that a 1% change in the lag value or previous return leads to a substantial 92% change in the current return. In the variance equation, the significant p-values for both RESID (0.0012) and GARCH (0.0001) indicate the presence of autoregressive conditional heteroskedasticity (ARCH) and generalized autoregressive conditional heteroskedasticity (GARCH) effects in the data. The existence of GARCH suggests that volatility will persist in the long run.

Table 4: E-Views Results of ARCH (1), GARCH (1) test

Dependent Variable: TASI
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 12/12/23 Time: 11:20
Sample (adjusted): 2005Q2 2023Q4
Included observations: 75 after adjustments
Convergence achieved after 27 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	685.4981	311.7578	2.198816	0.0279
TASI(-1)	0.921226	0.037563	24.52462	0.0000
Variance Equation				
C	59091.54	62159.23	0.950648	0.3418
RESID(-1)^2	0.620565	0.191581	3.239177	0.0012
GARCH(-1)	0.410440	0.102333	4.010838	0.0001

R-squared	0.782644	Mean dependent var	8640.043
Adjusted R-squared	0.779666	S.D. dependent var	2528.431
S.E. of regression	1186.839	Akaike info criterion	16.42274
Sum squared resid	1.03E+08	Schwarz criterion	16.57724
Log likelihood	-610.8528	Hannan-Quinn criter.	16.48443
Durbin-Watson stat	1.405353		

Comparative analysis between Crisis vs. Non-Crisis Periods

We conducted GARCH volatility forecasting using two distinct sample periods. First is the entire dataset spanning from 2005 Q1 to 2023 Q4 (Figure 3), here returns are showing high volatility initially that is getting stable in later on years. Second is a modified sample covering the period before the financial crises, specifically from 2005 Q1 to 2007 Q4, in order to compare the forecasting performance between these two datasets, aiming to identify any discernible shifts or variations in volatility dynamics associated with the financial crises. Subsequently, we utilized our GARCH model to forecast volatility for the extended period from 2008 Q1 to 2023 Q4 (Figure 4). Returns are showing very high volatility in year 2008 and 2009 (period of financial crises). It is getting stable later-on but again showing a spike after 2020 till 2022, which was the crises period of COVID 19 (Figure 4). This segmented approach enables us to capture and analyze potential changes in volatility patterns before, during, and after the financial crises, providing valuable insights into the market's response to these critical events.

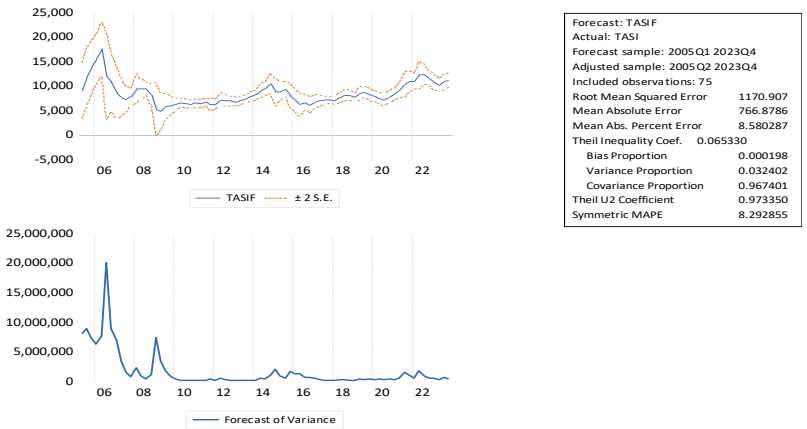

Figure 3: Forecasting GARCH Volatility on complete sample (2005 Q1 to 2023 Q4) Source: E-Views results

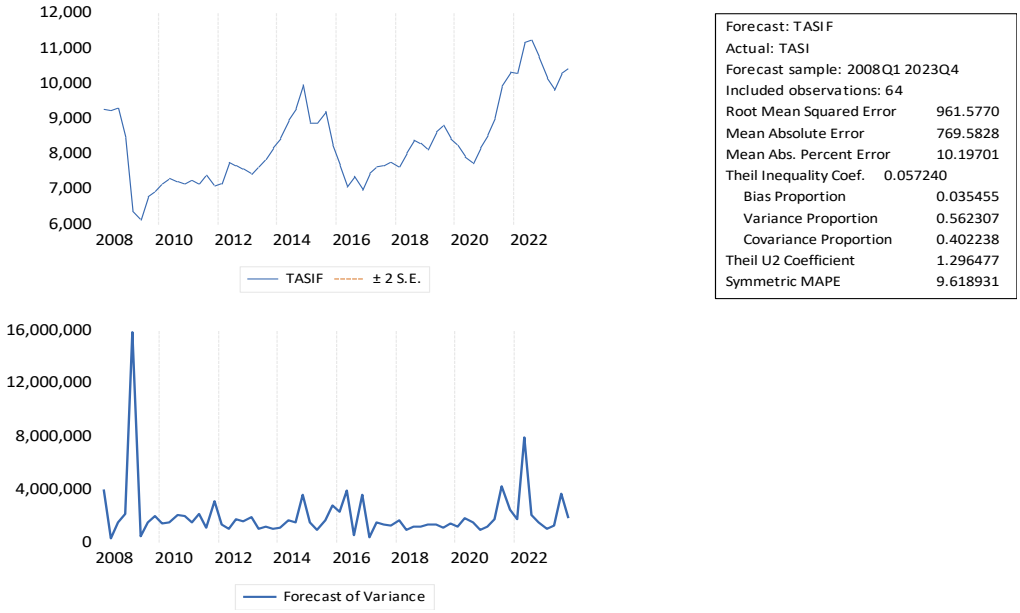

Figure 4: Forecasting GARCH Volatility on modified sample of before Financial Crises (2005 Q1 to 2007 Q4) and Forecast on 2008 Q1 to 2023 Q4

Source: E-Views results

Integrated Result Analysis

Combining the findings from descriptive statistics, unit root test, and GARCH modeling, we observe that TADAWUL's historical performance exhibits varying volatility, especially during periods of global financial crises. The positive skewness identified through descriptive statistics indicates the presence of outliers with exceptionally high values, contributing to increased volatility. The unit root test results assure stationarity considerations. The GARCH model, with its significant p-values in both mean and variance equations, reinforces the impact of financial market returns on current returns and the persistence of volatility over time. The 92% change observed in response to a 1% change in the lag value emphasizes the market's sensitivity to previous returns. The heteroskedasticity test underscores the importance of recognizing changing variances in ensuring the model's reliability.

VII. KEY DETERMINANTS OF TADAWUL VOLATILITY

The dynamics of stock market performance are shaped by a multitude of factors, ranging from macroeconomic indicators to global trends, geopolitical events, and market-specific conditions. These determinants interact in complex ways, contributing to the overall volatility and resilience of the market. Identifying key determinants of TADAWUL volatility is a crucial aspect of our study. Some effective determinants that we may consider are:

Macroeconomic Indicators:

Macroeconomic indicators such as GDP growth, inflation rates, and interest rates play a pivotal role in influencing investors' sentiment and market expectations. Strong economic growth may lead to increased investor confidence, positively impacting stock prices. Conversely, rising inflation or interest rates could introduce uncertainties, potentially contributing to higher volatility in TADAWUL returns.

Global Market Trends:

Global market trends serve as a barometer for investors' sentiment and risk appetite. Positive trends in major global markets can attract foreign investments, positively influencing TADAWUL returns. Conversely, adverse trends or global economic downturns may trigger risk aversion, contributing to heightened volatility in the stock market.

Oil Price Fluctuations:

Given the centrality of the oil industry in the Middle East, fluctuations in oil prices can significantly impact TADAWUL returns. For oil-exporting countries, a rise in oil prices may boost government revenues and corporate profitability, positively affecting stock market returns. Conversely, a decline in oil prices may lead to economic challenges, potentially contributing to increased volatility.

Political Stability and Geopolitical Events:

Political stability is paramount for investor confidence. Stable political environments often correlate with lower volatility and positive stock market returns. Geopolitical events, on the other hand, such as regional conflicts or geopolitical tensions, can introduce uncertainty, leading to increased volatility as investors react to geopolitical developments.

Market Liquidity:

Market liquidity, or the ease with which assets can be bought or sold, can impact TADAWUL returns. Higher liquidity generally contributes to smoother market operations and reduced volatility, as investors can enter and exit positions more easily. In contrast, lower liquidity may lead to larger price swings, potentially resulting in increased market volatility.

VIII. CONCLUSION

Our study has provided a thorough examination of TADAWUL's performance and resilience amidst global financial crises, employing a multi-faceted approach that integrates descriptive statistics, unit root testing, and GARCH modeling. Descriptive statistics offered insights into the market's fundamental characteristics, revealing varying volatility patterns and the presence of outliers. The unit root test assessed stationarity, guiding our modeling decisions and highlighting potential challenges. The GARCH model, a cornerstone of our analysis, identified significant volatility dynamics, demonstrating the market's sensitivity to historical returns and the persistence of volatility over time.

The comparative analysis between the complete dataset and a modified sample preceding financial crises unveiled notable shifts in volatility patterns associated with these critical events. The forecasting exercise further extended our understanding, shedding light on how the GARCH model performs across different economic contexts. The integration of findings contributes to a comprehensive evaluation of TADAWUL's resilience, providing valuable insights for investors, policymakers, and researchers.

Our study not only enhances our understanding of TADAWUL's historical performance but also lays the groundwork for future research endeavors. The identification of key determinants and resilience mechanisms, coupled with actionable policy recommendations, underscores the practical implications of our findings. As financial markets continue to navigate uncertainties, this study contributes to the ongoing discourse on market dynamics and resilience, offering valuable insights into the intricate interplay between TADAWUL and global financial crises.

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