



## **The mediating role of stock market liquidity on the relationship between Investor sentiment and Stock market volatility: An Applied study on Listed Companies in Egyptian stock Exchange**

***Research extracted from a PHD. thesis***

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## **The mediating role of stock market liquidity on the relationship between Investor sentiment and Stock market volatility: An Applied study on Listed Companies in Egyptian stock Exchange**

*Ghada Mohamed Abo El-ata; Dr. Mostafa Al Kerdawy and Dr. Maha Misbah Shabana*

### **Abstract:**

**Purpose:** We examined whether investor sentiment affects the volatility of the Egyptian exchange. While examining this relationship, we also test whether stock market liquidity is the channel than can affect the relationship between investor sentiment and Egyptian exchange volatility.

**Methodology:** This study adopted the positivism philosophy, quantitative method, and deductive approach. In addition, we collect secondary data from the financial statements of the listed companies on the EGX 100 comprise the study's population. After excluding statements from banks and financial institutions and relying solely on the consolidated financial statement, the sample consists of 305 observations from 76 firms. The data was analyzed to verify if the time series is a stationary time series or not by using Dick-Fuller test and GARCH model. Then, we use the correlation matrix coefficient and descriptive statistics to describe the data. Finally, the research model was validated with structural equation modeling (SEM).

**Findings:** Results of the study found a significant negative relationship between investor sentiment and stock market volatility. Besides, stock market liquidity partially mediates the relationship between investor sentiment and stock market volatility.

**Recommendations and Further Direction:** Based on the results, this study presents recommendations that could help to improve the performance of the Egyptian exchange. Also, it offers some directions for future research.

**Keywords:** Investor sentiment, Stock market liquidity, stock market volatility, EGX 100.

## **Introduction:**

The 2008–2009 global financial crises highlighted the importance of financial market stability. It also demonstrated the impact of liquidity and stock price volatility on future economic growth. Furthermore, volatility and liquidity are permanent characteristics of stock prices in global financial markets; they can foresee the upcoming financial crisis. As a result, volatility and liquidity are phenomena that cannot be ignored, their consequences cannot be avoided, and their impact on emerging and developed stock markets must be studied paralleled. (Ellington, 2018; Marozva et al., 2021; Nneji, 2015; Pan, 2019)

On one hand, volatility is essential in asset pricing because accurate predictions of stock volatility have significant economic value through enabling risk management strategies, contributing to the development of successful hedging strategies, and eventually leading to rational investment decisions (Dai&Chang, 2021; Lyocsa et al., 2021; Ma et al., 2022). On the other hand, liquidity in the stock market is an important indicator of the market's optimal operations. Liquidity specifies the amount of acceptable return for investors as well as the best trading strategy to apply. Hence, in markets with a high degree of participation by small investors, the influence of liquidity is clearly visible, and the lack of adequate liquidity in the stock market indicates an investor's aversion to trading. (Abudy; 2020; Naik & Reddy, 2021; Zhang & Lence, 2022).

Taking into account the recent dynamic movement in stock markets, it can be seen that classical models of finance theory based on efficient market hypotheses, such as capital structure and capital asset pricing models, failed to explain the extreme changes in stock prices. As a result, recently academics, portfolio managers, and investors focus on the behavioral aspect of investing (Chauhan, 2020; Gong et al., 2022; Obeng, 2019).

In this regard, the stock market is seen as a barometer of investor sentiment. It is critical for practitioners since it reveals the general mood of investors toward the stock market. Furthermore, investor psychology and mood can spread rapidly across the market. It can influence investors' risk attitude and the criteria's of portfolios selection according to subjective indicators that doesn't reflect the fundamental value (Ahmed, 2020; Wang et al., 2022).

Moreover, investors' ability to gather important and credible information is constrained by their limited and rare cognitive abilities (Aouadi et al., 2013). For example, when the stock market is surrounded by uncertainty, investor sentiment describes the reactions of investors in various markets. The high amount of uncertainty causes investors to act irrationally, resulting in mispricing (Kim et al., 2021). Hence, as investor sentiment moves stock prices away from their fundamental values, their effect on asset pricing has been the focus of attention for all stock market participants, whether policymakers, market makers, speculators, or arbitrageurs (Guo et al., 2021; Hsu & Tang, 2022).

However, investor sentiment provides valuable direct information for evaluating the Egyptian stock market's present and future situations (El-Gayar et al., 2021). It drives stock prices away from their true value, resulting in poorer levels of financial market efficiency, bad investment alternatives, and high stock market volatility. This decreases the performance of the stock market and leads to a major financial crisis like the one that occurred in 2008. In recent times, the interest has increased in studying the effects of behavioral determinants on investment decisions.

Based on the above argument, this study will address the causes of volatility on the Egyptian Stock Exchange, which is still suffering from instability despite the recent economic reforms pursued by the government. Though examining the stock market situation in recent years, the performance indicator ratio reached 80% in 2017. However, the performance indicators for the two years after that—2018 and 2019—showed a dramatic decline, as the ratio depicts negative values of -12.40% and -19.1%, respectively. Then, the performance ratio increased by around 22.24% in 2020. However, the stock exchange had a decline at the beginning of the first three months of this year that it had not seen all year, totaling roughly -33.4%. The appearance of COVID-19 at the start of 2020 might justify this excessive drop. Finally, in 2021 the indicator decreased from 41.34% to 5.08%, and this is considered a significant decrease in performance. The Egyptian Stock Exchange attributed the reason for these fluctuations to a number of reasons, including low trading volume and value, rigid trade markets trading rules, and inadequate mechanisms for attracting institutional investors.

Moreover, the number of the individual investors in the recent five years exceeds the number of institutional ones especially in 2021 as the number of individual investors reached to 57381 while institutional investors were about 1621. These Individual investors may be rational or irrational but both of them often don't have adequate information about the stock exchange products and services. Thus, most of them relied on feelings, expectation and their mental image about the investing in the stock markets.

So, we can expect that the increase in the number of the individual investors can have an effect on the volatility of the EGX 100 indicator. The previously discussed lacuna in the role of individual investors in the volatility of the EGX 100 index motivates the researcher to try to answer the following questions; does investor sentiment have an effect on stock market volatility? Also, does the relationship between investor sentiment and stock market volatility change when the stock market liquidity is investigated as a mediator.

## **2- Literature review and theoretical development:**

Noise traders in the stock markets have introduced additional systematic risks. These risks emerged due to three reasons: Firstly, the noise traders have destabilized the stock market through the inability to predict their future behavior. Secondly, they relied on their opinion as private information. Thirdly, new investors imitated the noise trader because their returns didn't take into consideration the amount of risk they encountered

(De long et al., 1990).

In this respect, the explanation behind these negative effects was the noise signals through which the noise trader speculated, which was called investor sentiment (Brown, 1991). The investor sentiment arose in markets characterized by illiquidity, information asymmetric, noise traders, and limits to arbitrage (Das et al., 2020).

Shleifer and Summers, (1991) defined investor sentiment as "The investor's overall attitude concerning the financial markets". Also, Lee et al. (1991) defined it as "The investor expectations about the returns of assets which are not justified by economic fundamentals". Then, Barberis et al. (1998) defined investor sentiment as "The belief formation leading to over and under reaction toward the stock return."

In addition, Shleifer, (2000) defined it as “Heuristic behaviors based on beliefs or rule of thumb rather than Bayesian rationality in making own investment decisions”. Furthermore, Baker & Wurgler, (2006) defined it as “A misguided belief about a firm’s risk or future cash flow that is unjustified in terms of information available”.

In this line, most definitions of investor sentiment focused on investors' feelings, attitudes, behaviors, and emotions, but they did not highlight the importance of market circumstances in the rise of this phenomenon, particularly in emerging markets such as the Egyptian case.

The Egyptian stock market is vulnerable to speculative trading and noise traders. Furthermore, investor over confidence dominates the trading activities because some investors may overestimate their information or underestimate risk. As a result, the Egyptian stock market is psychologically influenced (Metwally & Darwish, 2015).

Therefore, this study proposed a definition of investor sentiment as: “Investor sentiments are the behaviors, feelings, emotions, beliefs, and expectations that lead to an investor’s optimism or pessimism and the bullish or bearish impact on the financial markets”.

Besides, investor sentiment has a significant effect on stock return and price per earning ration. For more clarification, there also exists ample evidence suggesting that investor sentiment had a significant impact on stock returns and mispricing, because investor sentiment has predictive power for future stock returns, especially for firms with particular characteristics (small& young, high volatility, unprofitable, no dividend-paying, and fast-growing) (Lan et al., 2020). Moreover, investor sentiment had a greater impact on small-firm stock prices than big-firm stock prices, and individual stock sentiment led to much sharper volatility of stock prices in the stock market downturn than in the stock market expansion (Li & Yang, 2017).

Focusing on the emerging markets, in the Pakistan stock market, Khan and Ahmed (2019) asserted that the Pakistan market is inefficient, characterized by the unavailability of adequate information to make a rational decision. So, there is a delay in a stock price correction after financial shocks. Thus, they asserted that the relationship between sentiment and return can’t be considered a temporary reaction but it is a long-term relationship and its effect ends only when the stock price correction occurs.

On the other hand, in China, Ni et al. (2015) found that Chinese investors have cognitive bias and speculation about different firm and industry characteristics. So, the over-reaction was a noticeable phenomenon in the Chinese stock market. They concluded also that the effect of investor sentiment is more significantly positive for stocks with a high return in the short term (less than 6 months) while there is a negative relationship for stocks with small return in the long term (from 6-24 months) because small or young stocks are easier to arbitrage than large stocks.

Additionally, in China's stock markets it can be said that when the changes in noise trader sentiment (pessimistic or optimistic) were moderate, the stock return was positively correlated with the change of investor sentiment, which is called "the momentum effect". As a result, the noise trader accounts for a considerable proportion of the total number of traders, eventually defeating the rational investor and creating their own living space. But in the case of extreme changes in investor sentiment (optimistic or pessimistic), the stock return was negatively correlated with the change of investor sentiment. So, the survival space of noise traders disappeared. And the arbitrage space of rational investors appeared, and then they drove the market prices to the fundamental values (Li, 2020).

Moreover, Sentiment should be considered as a source of risk compensation (risk premium). Because it reflects investors' attitudes towards uncertainty, the effect of risk compensation on stock returns might change because of investor sentiment. For instance, investor pessimism can lead to an increase in the risk premium, and if investor risks tolerance positively due to pessimism, a higher risk premium is expected and vice versa (He et al., 2018).

In addition to these results, Main and Sankaraguruswamy (2012) asserted that investor sentiment moves the price of stocks toward the news direction, i.e., good earnings news led to a high level of sentiment which affected the stock price positively and vice versa. Also, Li et al, (2012) agreed with these results and they found that during high-sentiment periods, the stock price sensitivity to good earnings news increases with investor sentiment, whereas the stock price sensitivity to bad earnings news is related to investor sentiment and vice versa. These effects appeared clearly in small, volatile, young, non-dividend paying stocks. These results were accepted by (Hibar & Mcinnis, 2012) as they found that investor sentiment influenced the investor's earning expectations.

In line with that, Jitmaneroj, (2016) explored the relationship between investor sentiment and P/E ratio in USA industries. He asserted that stock valuation is driven by investor sentiment, and found a significant positive relationship between investor sentiment and P/E ratio. This means that during periods of extreme optimism, stock prices derived away from their intrinsic value and, therefore, periods of high investor sentiment are followed by periods of high P/E ratios.

Additionally, Rahman and Shamsuddin, (2019) concluded that there was a significant and positive relationship between investor sentiment and price-earnings ratio in the G7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States). They also considered the excessively high price-earnings ratio reflected in the overvalued market, fully caused by optimistic investor sentiment.

In addition, the behavior of financial market volatility has inspired the attention of policymakers and market practitioners alike. Policymakers were interested in investigating its impact on the economy, while market practitioners, such as investors and brokers, were interested in investigating its effects on stock pricing (Corradi et al., 2013).

According to this, stock market volatility is an indicator of the economy's stability and growth (Babatunde, 2013; Schwert, 1990). It measures the return dispersion in a particular stock market (Irshad, 2017). So, it assists in the forecast of financial stress and market uncertainty (Zaremba et al., 2020) and was regarded as a valuable tool for pricing and managing risky assets (Busch, 2011; Fassas & Siripoulos, 2021; Srinivasan & Mamtha., 2016).

Schwert, (1990) defined volatility as “a measure of the changeability or randomness of asset prices, usually the standard deviation or variance of the rate of return”. Also, Srinivasan & Ibrahim, (2010) defined it as “a conditional variance or standard deviation of stock return that is not directly observable”. Moreover, Rajput et al. (2012) defined volatility as “a measure of the difference between an asset’s current price and its average past prices”.

Stock market volatility was correlated to the degree of risk in the stock market; it had a significant effect on returns (Jiang & Jin, 2020). As a consequence, stock market volatility caused an unjustifiable increase in stock prices, adding uncertainty to expected returns since it provided incorrect information about the underlying price of the stock (Dixit & Agrawal, 2020).

In line with that, the risk-averse investor's desire to invest was reduced by the uncertainty of the return and the high amount of risk he faces (Day & Lewis, 1992; Smith, 1988). The risk-tolerance investor, on the other hand, desired to increase the predicted risk premium for taking on additional risks, which would affect the investors' wealth and expenditures (Chung & Chuwonganant, 2018; Mala & Reddy, 2007).

Additionally, stock market volatility has had a significant negative impact on real GDP growth, inflation, and interest rates in Nigeria. Thus, the unpredictability of the future of the stock market hampered the proper functioning of the financial system and ultimately negatively affects economic performance (Babatunde, 2013).

Besides, Tan and Floros, (2012) examined the relationship between stock market volatility and bank performance in China. They concluded that the high level of volatility doesn't lead to improvement in bank profitability, but it is translated into an excess return on equity.

In contrast, the stock volatility was significantly and positively correlated to economic growth. And it had significant power for forecasting the GDP (Campbell et al., 2001; Levine & Zervos, 1998). In line with that, Muhtaseb and Al-assaf, (2017) concluded that stock market volatility positively and significantly affected emerging economics in developing financial markets rather than in developed economics.

In this line, A liquid market is one in which large transactions can be executed with little or no impact on asset prices ( Brunnermeier & Pederson, 2009). So, in the absence of a liquid stock market, many profitable long-term investments would be avoided because savers would be afraid to wrap up their assets for long periods of time (Khaliq, 2013).

Switzer and Picard, (2016) defined it as: "the degree to which the asset can be purchased or sold without significantly affecting its price". Gold et al., (2017) also defined liquidity as: "The quickly sell or buy any amount of assets at any time the investor wants". In addition, Bedowska-Sojka and Kliber, (2019) defined it as: "Buying and selling stocks at a cheap cost and with minimal price impact". Then, Chulia et al. (2019) defined liquidity as: "Trading a large amount of the asset without causing the equilibrium prices to drop".

Ma et al. (2016) concluded that the stock market liquidity is positively related to the share issuance and firm transparency but related negatively to dividends paid out. Besides, the illiquid markets made investors fear about executing the transactions that may cause loss due to the price changes (Kuamr & Misra, 2015).

Based on the above, Investor sentiment has a significant effect on stock market liquidity and volatility. For more explanation, on one hand, irrational investor sentiment tends to increase stock market volatility. Investors overreacted to new information in the stock market, which led to increased speculation on stock prices (Hautsh & Hess, 2007; Pastor&Veronesi, 2008). Moreover, the investor's interacted differently with the flow of good or bad information which include some economic issues such as changes in growth rates, government policies, and interest rate or company- specific issues such as periodical reports, dividend declaration, and merger& acquisition (Srinivasan&Mamtha, 2016).

Moreover, (Lee et al., 2002; Verma&Verma, 2007; Perez-Liston et al., 2016) discovered a negative relationship between investor sentiment and volatility in developed markets such as the United States, while Brown, (1991) discovered a positive relationship, but Gong et al., (2016) discovered no relationship between sentiment and volatility. He said that excessive or non-extreme volatility cannot impact investor sentiment in certain markets, such as the United States of America.

In emerging markets such as India, China, and Turkey, researchers noted a significant effect of sentiment on stock market volatility (Kimari & Makdud, 2015; Long et al., 2021; Chen et al., 2020; P.H&Rishad, 2020). Furthermore, Xindan and Bing, (2008) stated that the relationship between investor sentiment and volatility was negative, while Jiang and Jin, (2021) found a positive relationship between them.

On the other hand, in the developed markets, Lui et al., (2015) saw that when investor sentiment was high, stock market liquidity rises. Also, Chui et al., (2018) concluded that psychological biases explained changes in stock market liquidity during financial crisis. As a result, optimism sentiment increased liquidity level, whereas pessimism decreased them.

Liquidity is a key factor in determining financial market volatility (Qiao et al., 2020). Ramos and Righi (2020) found also that increases in volatility were a predictor to an increase in illiquidity and a drop in trading volume. As a result, liquidity evaporated up as a result of volatility shocks.

Based on the above discussion, we can note the following gaps; the behavior of individual investors plays a significant role in stock markets, especially in emerging markets (Brown, 1991; Metawa et al., 2018; Verma & Verma, 2007). However, few researches investigated the impact of investor sentiment in emerging markets because most recent research focused on investor sentiment in developed markets, especially the U.S. stock market, whose findings are difficult to generalize in emerging markets (Xindan & Bing, 2008).

Also, the application of recent studies on emerging and inefficient stock markets like Egypt's allows comparison and study of the differences between developed and emerging financial markets and introduces a new point of view to the literature on financial markets (He et al., 2019). Based on the above, little empirical research has dealt with the relationship between investor sentiments, market liquidity, and volatility in the stock market, particularly in the Arabic stock markets.

In addition, this study focused on investor sentiment as an antecedent to stock market volatility, in addition to the fact that this study is one of the first studies that dealt with the influence of investor sentiment as an introduction to the liquidity and volatility of the Egyptian Stock Exchange. Thus, the major contribution is to fill the gap between the indirect relationship of the stock market liquidity on the relationship between investor sentiment and the volatility of the Egyptian stock market.

Thus, my proposal helps to fill the gap in research with respect to how individual stock liquidity interprets unexpected changes in investor sentiment, as well as how these changes affect volatility. We expect that it will help in optimizing investment decisions and clarifying the information response mechanism in stock market. As a result, and based on the above, the study assumed the following:

**H1: There is a significant effect of investor sentiment on stock market volatility.**

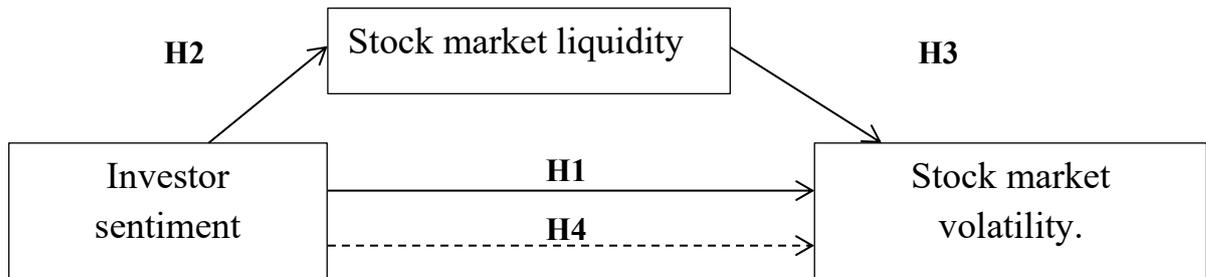
**H2: There is a significant effect of investor sentiment on stock market liquidity.**

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**H3: There is a significant effect of stock market liquidity on stock market volatility.**

**H4: Stock market liquidity mediates the relationship between investor sentiment and stock market volatility.**



Source: prepared by the researcher based on literature.

**Figure (1)**

**The research model**

**3) Data description, variables and empirical design:**

**3.1) Data source and sample selection:**

The best tool for collecting secondary data that is quantitative in nature is Content analysis for documents and records are. In this regard, content analysis for documents and records can provide several benefits. For instance, documenting historical information, the ability to collect data in a standardized manner, and improving data collection accuracy are among the tasks.

The sampling unit used in the current study is the report of every listed Egyptian firm. Therefore, the population of this study forced the researcher to choose an intentional control sample by collecting the items that meet these criteria. Firstly, the firm must be listed on EGX 100 index because of ensuring the most traded firms. Secondly, the firm must be in the time period 2017-2021 because of excluding the effects of inflation. Thirdly, the firm must have consolidated financial statements. Finally, this study excluded the banks and the financial institutions because of its special nature that may affect on the variables.

Consequently, using these criteria, the sample of my research represented 76 firms that recorded 380 observations (76 firms × 5 years), and by excluding 40 observations that are not traded by the Egyptian currency and 35 observations that are outliers, the final sample will be 305 observations distributed across the sectors according to table No. (1) as follows:

**Table No. (1): Sample distribution on the listed sectors**

<b>Sector</b>	<b>Firms</b>	<b>Observations</b>
Communication	5	20
Media	1	5
Foods	13	50
Construction	10	55
Industrial	11	45
Health care	2	10
Tourism	6	25
Real Estate	12	40
Gas & Oil	1	5
Chemicals	3	15
Home & Personal Products	4	15
Basic Resources	8	20
<b>Total</b>	<b>76</b>	<b>305</b>

Source: prepared by the researcher based on the database of Egyptian stock exchange website.

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### 3.2) Measurement of variables:

We measure the variables by using the following indicators:

- **Independent (Explanatory) variable: Investor sentiment:**

In this context, Baker and Wurgler (2006) constructed a comprehensive investor sentiment indicator that aggregates the information from six proxies; Closed-end fund rate, share turnover, Number of IPO, first day returns of the IPO, Equity share in new issues.

**According to the following equation:**

$$\text{Sent} = \text{CEFD} + \text{TURN} + \text{NIPO} + \text{RIPO} + \text{PDND} + \text{EQTI}.$$

Where,

- a) CEFD: Closed-end fund rate.
- b) TURN : Share turnover,
- c) NIPO : Number of IPO(initial public opening),
- d) RIPO : Return of IPO(initial public opening),
- e) PDND : First day returns of the IPO,  $\text{PDND} = \text{dollar value of paid dividend per share in particular year} \div \text{dollar value of one share of stock}.$
- f) EQTI : Equity share in new issues.

- **Mediation variable: Stock market liquidity:**

Recently, Qiao et al. (2020) transformed Amihud illiquidity into liquidity measure. This measure implied the return on day, and the number of valid observations one day and the trading volume per one hundred million in minute. Therefore; they employ the following measure to calculate market liquidity which is defined as:

$$\text{LIQ}_t = - \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{|R_{i;t}|}{V_{i,t}}$$

Where  $R_{i;t}$  is the  $i$  th return on day  $t$ , and  $N_t$  is the number of valid observations one day and  $V_{i;t}$  is trading volume per one hundred million in minute  $i$  in interval  $t$ .

- **Dependent (Explained) variable: stock market volatility:**

ARCH&GARCH models employed to measure the stock market volatility, the two models estimate the variance of the forecasted return based on the past forecasted errors and past estimates of volatility **According to the following equation:**

- a) ARCH model applied as follows:  $R_t = a + u$

Where,  $R_t$  is return at time  $t$ , and  $u$  is the random error term.

- b) Then, calculate the difference in the return for each individual year deviates from the average.  $\hat{U}_t = (R_t - \hat{R}_t)$ .

#### 4) The data analysis and results:

##### 4.1) Stationary Tests:

In this section we use both Dickey-fuller and ARCH/GARCH tests to verify the stationary of the study's time series as follows:

##### A) Dickey-Fuller test (ADF):

An augmented Dickey-Fuller test (ADF) in statistics and econometrics tests the null hypothesis that a unit root exists in a time series sample. The alternative hypothesis usually refers to the stationary or trend-stationary according to the used version of the test. The augmented Dickey-Fuller (ADF) statistic, used in the test, is a negative number. The more negative it is, the stronger the rejection of the hypothesis that there are unit roots at some level of confidence (Velasco, 1999). Consequently, the results of this test can be shown in the following table (2) as follow:

**Table (2): Dickey-Fuller test (ADF) Results**

Variable	Test Stat.	P-Value	Critical Value (1%)	Critical Value (5%)	Critical Value (10%)
<b>Investor sentiment (SEN)</b>	-17.791	0.000	-3.988	-3.428	-3.130
<b>Liquidity (LIQ)</b>	-12.205	0.000	-3.988	-3.428	-3.130
<b>Volatility (<math>\hat{U}_t</math>)</b>	-18.117	0.000	-3.988	-3.428	-3.130

Source: prepared by the researcher based on the statistics results.

Table (2) showed that the test statistics for investor sentiment, stock market liquidity, and stock market volatility are (-17.791), (-12.205), and respectively (-18.117). These values are less than critical values, implying that they are more negative than the critical value at all levels of confidence (1%, 5%, and 10%). So, the alternate hypothesis was accepted that the time series is stationary (or trend-stationary). This means that the chosen time series didn't have sharp changes in its mean and variance.

**B) Autoregressive conditional heteroskedasticity (ARCH/GARCH):**

The volatility in the chosen time series was measured using the ARCH/GARCH model. Autoregressive conditional Heteroskedasticity (ARCH) is a statistical model used to analyze volatility in time series in order to forecast future volatility. In the financial world, ARCH modeling is used to estimate risk by providing a model of volatility that more closely resembles real markets. ARCH modeling shows that periods of high volatility are followed by more periods of high volatility, and periods of low volatility are followed by lower volatility. This means that volatility or variance tends to cluster, and similar movements in the stock markets can be grouped together. Thus, it is useful to investors when considering the risk of holding an asset over different time periods.

Additionally, Generalized Autoregressive Conditional Heteroskedasticity (GARCH) is a statistical model used in analyzing time-series data where the variance error is believed to be serially auto correlated. GARCH models assume that the variance of the error term follows an autoregressive moving average process.

Although GARCH models can be used in the analysis of a number of different types of financial data such as macroeconomic data, financial institutions typically use them to estimate the volatility of returns for stocks, bonds, and market indices. They use the resulting information to help determine pricing and judge which assets will potentially provide higher returns, as well as to forecast the returns of current investments to help in their asset allocation, hedging, risk management, and portfolio optimization decisions.

Essentially, wherever there is heteroskedasticity, observations do not conform to a linear pattern. Instead, they tend to cluster. Therefore, if statistical models that assume constant variance are used on this data, then the conclusions and predictive value one can draw from the model will not be reliable. Consequently, the insignificant results of ARCH/GARCH indicates that data is stationary, and the results of these tests can be shown in the following table No. (3) as follow:

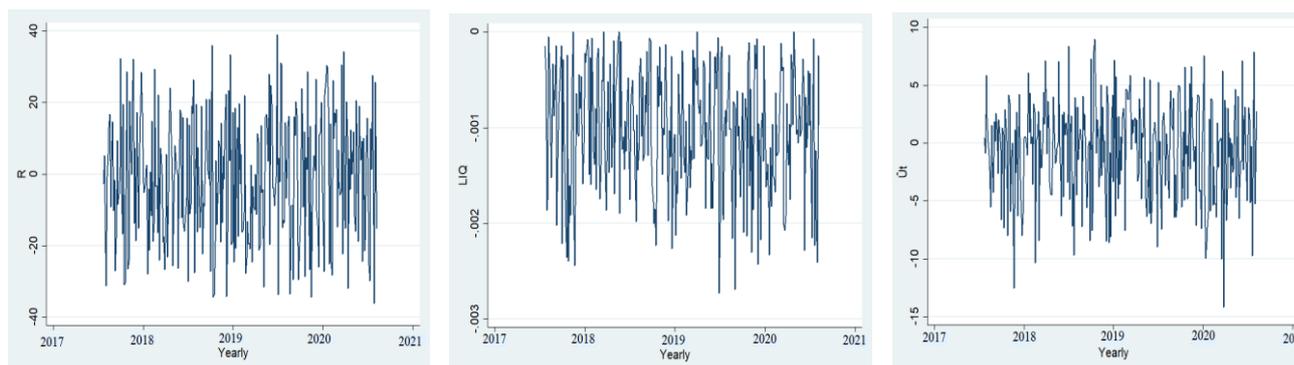
**Table (3): ARCH/GARCH Tests Results**

Variable	ARCH/GARCH	Coef.	Z-Statistics	P>  z
Investor sentiment (SEN)	ARCH	-0.055	-0.55	0.586
	TARCH	0.182	1.05	0.292
	GARCH	0.589	1.21	0.228
Liquidity (LIQ)	ARCH	0.033	0.35	0.723
	TARCH	0.218	1.16	0.246
	GARCH	0.424	0.81	0.420
Volatility ( $\hat{U}_t$ )	ARCH	0.098	1.05	0.294
	TARCH	-0.165	-1.30	0.192
	GARCH	0.764	1.23	0.225

Source: prepared by the researcher based on the statistics results.

The above results showed that all variables in this study are insignificant in the stationary tests (ARCH/GARCH/TARCH) which mean that all variables are stationary and follows the normal distribution.

Consequently, the study expresses about these variables through these following charts:



#### 4.2) Control Variables, descriptive statistics, and correlation matrix:

##### A) Control variables:

In this regard, we used the control variables listed below based on (Bernerth and Aguinis' 2016) justification, emphasizing the possibility of relying on the selected control variables because they had been used in many previous studies. Given that the dependent variable is stock market volatility. We select some firm characteristics that influence volatility, such as leverage (Duffee, 1995; Schwert, 1991; Sudarman&Diana, 2022), Earnings per share (Das&Pattanayak, 2009; Obaid&Jassim, 2022 Sharif&Pillai, 2015; Irfan&Nishat, 2002) and operating growth (Binder & Merges, 2001). Consequently, the list of control variables in my study can be shown as follows:

**Table (4): Control Variables**

Variables	Symbol	Measurement Tool
Leverage	Lev	Total Debt/Total Assets
Earnings Per Share	EPS	Earnings distributed on the investors
Operating Growth	OG	(Revenue for t – Revenue for t-1)/Revenue for t

Source: prepared by the researcher based on the statistics results.

**B) Descriptive statistics:**

In this section, the researcher went through some procedures to ensure that the conditions of the parametric statistical techniques that will be used were available. Byrne (2010) stated that data examination is a very important step before testing the measurement model, especially when structural equation modeling is employed. Thus, table (5) shows the descriptive statistics for these study variables. This table contains the mean, standard deviation, skewness, and kurtosis for the items used to measure each variable as follows:

**Table (5): Descriptive Statistics**

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
SENT	305	7.174	8.047	7.766	0.204	-0.550	-0.747
LIQ	305	-0.00273	0.00000	-0.00103	0.00064	-0.32510	-0.71001
Ūt	305	-14.164	8.996	-0.628	4.268	-0.311	-0.349
Lev	305	0.450	0.850	0.643	0.120	0.145	-1.192
EPS	305	1.240	4.590	2.747	0.974	0.236	-1.171
OG	305	-0.100	0.150	0.028	0.075	-0.026	-1.252

Source: prepared by the researcher based on the statistics results

Table (5) illustrated the descriptive statistics of the investor sentiment (dependent variable), mediator (Stock market liquidity), independent variable (Independent variable), and the control variables (leveraging, earning per share, and operating income) based on (305) observation (See table 5, p.81).

The maximum value of investor sentiment was (7.174) and the lowest level is approximately (8.047). The mean of the investor sentiment reaches to (7.766) which reflected that the expected value of using sentiment in EGX 100 transactions will be significant. Besides, the mean value of the stock market liquidity was (- 0.00103) and the maximum and minimum values in the time series under study range from (-0.00273) to (0.0000). So, this negative value indicated a decrease in the level of liquidity. Finally, the mean of the stock market volatility was (-0.628) and the standard deviation reached (4.268). Although the notable dispersion of the values from its mean, the values of the stock market volatility are relatively stable as it lies between its maximum and minimum values. In regard to the control variables, it is obvious that all control variables are not scattered because their means are mediated between the minimum and maximum of these variables. Additionally, the standard deviations of all variables are low which means that all variables are not scattered. In addition, the normal distribution of data can be achieved when the absolute values of skewness range between  $-1$  and  $+1$ , and the values of kurtosis range between  $-10$  and  $10$  (Blanca et al., 2013). These two conditions are satisfied for all the variables, so the data follows the normal distribution. Based on the above results, we can conclude that all the variables follow a normal distribution. Investor sentiment, liquidity, volatility, and operating growth are left-skewed, while leveraging and earnings per share are right-skewed. Moreover, the kurtosis values of all variables showed a flatter bell curve.

### **C) Correlation matrix:**

The Pearson correlation coefficient (PCC) is a measure of linear correlation between two sets of data in statistics. It is also known as Pearson's  $r$ , the Pearson product-moment correlation coefficient (PPMCC), the bivariate correlation, or simply the correlation coefficient. It also reflects the ratio between the covariance of two variables and the product of their standard deviations; thus, it is essentially a normalized measurement of the covariance, such that the result always has a value between  $-1$  and  $1$ . As with covariance itself, the measure can only reflect a linear correlation of variables and ignores many other types of relationships or correlations. In this study, Pearson's  $r$  correlation among variables' dimensions can be shown in table (6) as follows:

**Table (6): Pearson correlation Matrix**

Variables	SENT	LIQ	$\hat{U}_t$	Lev	EPS	OG
SENT	1					
LIQ	.257**	1				
$\hat{U}_t$	-.157**	-.170**	1			
Lev	.099	.147*	-.016	1		
EPS	-.092	-.011	-.002	-.007	1	
OG	.047	.065	.011	.060	-.117*	1

Source: prepared by the researcher based on the statistics results. \*, and\*\* represent significantly at the 10% and 5% respectively.

We conduct a correlation analysis of the variables and control variables, including investor sentiment, stock market liquidity, stock market volatility, leveraging, earnings per share, and operating growth.

The key explanatory variable is investor sentiment, which has a significant positive correlation with liquidity ( $R = 0.257$ ) but a significant negative correlation with stock market volatility ( $R = -.157$ ). This means that the increase in investor sentiment will lead to an increase in liquidity and a decrease in volatility. Moreover, the correlation between liquidity and volatility is negative ( $R = -.170$ ) indicative of a negative effect of liquidity and volatility. Additionally, the results ensure that there is no multicollinearity among all variables because all correlation coefficients are less than (0.8) (Sherstha, 2020).

#### **4.3) The structural equation model:**

Given the previously mentioned explained variable (stock market volatility), exploratory variable (investor sentiment), and control variables (leveraging, earnings per share, and operating growth), we employ the structural equation modeling (SEM) to test the previously mentioned hypotheses. SEM is the appropriate statically method for the study variables because the normal distribution of data, sample size between 100 and 400, and no multicollinearity between dependent and independent variables (Byrne, 2010; Nunkoo&Ramkissoon, 2012).

In this line, first of all we conduct the indices of model fit that evaluate the fitness of the model to examine data (Smith&McMillan, 2001). Then, we use two basic steps to build the model. In the first stage, we examine the direct correlation between the three variables. We then develop an intermediary effect test based on the results of the first stage to confirm the role of stock market liquidity in the relationship between investor sentiment and stock market volatility.

**4.3.1) The model fit indices:**

In this section we depend on five major indices to investigate the fitness of model. Firstly, the Goodness Fit Index (GFI) assesses the fit of the model to test data. It ranges between zero and one, with zero indicating a complete lack of fit and one indicating a perfect fit (Mulaik et al, 1989). The Root Mean Square (RMS) represents the square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. When the value is less than (0.08) that means that the model is fit (Pavlov et al., 2021). The Comparative Fit Index (CFI) reflects the level of variances, when the value is more than 0.90 this mean that the model is fit (Lia&Yoon, 2015). The non-normed fit index is another name for the Tucker-Lewis Index (TLI). It is used in the modeling of the linear mean and covariance structure, especially in exploratory factor analysis; the closer it is to one, the better the model fits the data (Cai et al., 2021). Last but not least, covariance structure model evaluation is done using Root Mean Square Error of Approximation (RMSRA). When it is less than 0.8, the model is said to be fit (Steiger, 1998). Based on the above, Table (7) summarized the indices used to test the fit structural model as follows:

**Table (7)**

**The indices of model fit for the structural model**

<b>Measure</b>	<b>Symbol</b>	<b>Estimate</b>	<b>Threshold</b>	<b>Interpretation</b>
<b>Goodness fit index</b>	GFI	0.968	Closer to 1	Accepted
<b>Root mean square residual</b>	RMR	0.054	Closer to 0	Accepted
<b>Comparative fit index</b>	CFI	0.975	Closer to 1	Accepted
<b>Tucker-Lewis index</b>	TLI	0.984	Closer to 1	Accepted
<b>Root mean square error of approximation</b>	RMSEA	0.542	Less than 0.8	Accepted

Source: prepared by the researcher based on the statistics results

The value of CFI is 0.968, which is accepted as it is greater than 0.95. Furthermore, the value of the RMR index is also satisfied because it is lower than 0.05. Similarly, RMSEA equals 0.542, which lies under 0.8 as proposed by (Byrne, 2010). The value of GFI, which equals 0.975, is accepted as it is higher than 0.8 (Byrne, 2010). Therefore, the measurement model fits the data collected from the reports of listed firms.

#### **4.3.2) The Direct relationship between the variables:**

First step: the researcher can develop the regression models for testing the direct effects as follows:

##### **Model (1): The direct relationship between the Investor sentiment and the stock market volatility:**

$$\hat{U}_t = \beta_0 + \beta_1 \text{SENT} + \beta_2 \text{Lev} + \beta_3 \text{EPS} + \beta_4 \text{OG} + \varepsilon. \quad (1)$$

**Where:**

$\hat{U}_t$  = Stock Market Volatility;

SENT = Investor sentiment;

The remained variables are defined above.

##### **Model (2): The direct relationship between the Investor sentiment and the stock market Liquidity:**

$$\text{LIQ} = \beta_0 + \beta_1 \text{SENT} + \beta_2 \text{Lev} + \beta_3 \text{EPS} + \beta_4 \text{OG} + \varepsilon. \quad (2)$$

**Where:**

SML = Stock Market Liquidity;

The remained variables are defined above.

##### **Model (3): The direct relationship between the stock market Liquidity and the stock market volatility:**

$$\hat{U}_t = \beta_0 + \beta_1 \text{LIQ} + \beta_2 \text{Lev} + \beta_3 \text{EPS} + \beta_4 \text{OG} + \varepsilon. \quad (3)$$

**Where:**

All variables are defined above.

*Therefore, the researcher can show the results of multiple regressions as follow:*

##### **A) Testing direct relationship between the investor sentiment and the stock market volatility:**

Testing this direct relationship requires running the model No. (1) Which lead to these results in table (8) as follows:

**Table (8): Results of model (1)**

Summary of model (1)		Dependent variables: stock market volatility			
Independent variable: Investor sentiment.					
Variables	Coefficients	P-Value	T-Test	Collinearity statistics VIF	
Constant	1.206	0.449	0.758		
SEN	-0.121	0.006	-2.756	1.020	
LEV	-0.047	0.982	-0.023	1.013	
ESP	-0.066	0.795	-0.260	1.022	
OG	.927	0.776	0.285	1.019	
<b>R Square</b>		.25	<b>F- Value</b>	<b>2.929</b>	
<b>Adjusted R Square</b>		.12			
<b>Standard error</b>		4.2	<b>Model P – Value</b>	<b>0.016</b>	
<b>Durbin – Watson</b>		2.256			
ANOVA					
Model	Sum of squares	DF	Mean of square	F	Sig.
<b>Regression</b>	138.85	4	34.713	2.93	.016
<b>Residual</b>	5398.8	300	17.996		
<b>Total</b>	5537.64	304			

Source: prepared by the researcher based on the statistics results.

Table (8) reveals that investor sentiment is negative associated with the stock market volatility ( $\beta = -.121$ , P-value=0.016 less than 0.05). Moreover, the adjusted R square is equal to 12%, which means that investor sentiment and the other control variables explain 12% of the change in stock market volatility. This result motivates further research in exploring more variables that may have an effect on the stock market volatility.

Noting that, the Durbin–Watson is significant because its value is equal to 2.256, which is greater than 2, and the VIF for all variables was less than 10, which means there is no multicollinearity. **Therefore, we can accept the alternate hypothesis for H1 as follow:**

*There is a negative significant effect of investor sentiment on stock market volatility.*

**B) Testing direct relationship between the investor sentiment and the stock market Liquidity:**

Testing this direct relationship requires running model No. (2) This led to these results in table (9) as follows:

**Table: (9) Results of model (2)**

<b>Summary of model (2)</b>					
<b>Dependent variables: stock market liquidity.</b>					
<b>Independent variable: Investor sentiment.</b>					
<b>Variable</b>	<b>Coefficients</b>	<b>P-Value</b>	<b>T-Test</b>	<b>Collinearity statistics</b>	
				<b>VIF</b>	
<b>Constant</b>	-0.002	0.000	-8.055		
<b>SEN</b>	0.257	0.000	4.379	1.020	
<b>LEV</b>	0.001	0.032	2.151	1.013	
<b>ESP</b>	1.199	0.745	0.326	1.022	
<b>OG</b>	0.000	0.387	0.867	1.019	
<b>R square</b>	0.083		<b>F Value</b>	6.816	
<b>Adjusted R Square</b>	.071				
<b>Standard error</b>	.00062		<b>Model P – Value</b>	0.000	
<b>Durbin – Watson</b>	2.395				
<b>ANOVA</b>					
<b>Model</b>	<b>Sum of square</b>	<b>DF</b>	<b>Mean of square</b>	<b>F</b>	<b>Sig.</b>
<b>Regression</b>	.000	4	.000	6.186	.000
<b>Residual</b>	.000	300	.000		
<b>Total</b>	.000	304			

**Source:** prepared by the researcher based on the statistics results.

Table (9) indicate that investor sentiment is positively associated with the stock market liquidity ( $\beta=.257$ , P-value=0.000 less than 0.05). In addition, the Adjusted R Square is equal to 7.1% which is meant that investor sentiment and the other control variables explain 7.1% of the change in the stock market liquidity. This result motivates further research in exploring more variables that may have an effect on the dependent variable, stock market liquidity. Moreover, the Adjusted R Square is equal to 7.1% which is meant that investor sentiment and the other control variables explain 7.1% of the change in the stock market liquidity. This result motivates further research in exploring more variables that may have an effect on the dependent variable, stock market liquidity.

We can note that, the significance of the model in interpreting the changes in the dependent variable stock market liquidity where ( $F = 6.816$ ) with significance ( $P\text{-Value} = 0.000$ ), which is less than 0.05. Furthermore, the Durbin–Watson is significant because its value equals 2.395, which is greater than 2, and the VIF for all variables was less than 10, which means there is no multicollinearity. Therefore, we can accept the alternate hypothesis for H2 as follow: *There is a positive significant effect of investor sentiment on stock market Liquidity.*

**C) Testing direct relationship between the stock market liquidity and the stock market volatility:**

Testing this direct relationship requires running the model No. (3) Which lead to these results in table (10) as follows:

**Table No. (10): Results of model (3)**

Summary of model (3)					
Dependent variable: stock market volatility					
Independent variable: stock market liquidity.					
Variables	Coefficients	P-Value	T-Test	Collinearity statistics VIF	
Constant	-2.011	0.212	-1.251		
LIQ	-0.139	0.003	-2.999	1.025	
LEV	0.288	0.888	0.141	1.025	
EPS	-0.007	0.978	-0.028	1.014	
OG	1.196	0.713	0.368	1.021	
R Square	.29			3.279	
Adjusted R Square	.17	F -Value			
Standard error	4.23	Model P – Value			0.006
Durbin - Watson	2.312				
ANOVA					
Model	Sum of Squares	DF	Mean square	F	Sig.
Regression	163.307	4	40.827	3.28	.006
Residual	5374.34	300	17.914		
Total	5537.65	304			

Source: prepared by the researcher based on the statistics results.

Table (10) indicate a negative relationship between stock market liquidity and stock market volatility ( $\beta = -.139$ , P-value=0.006 less than 0.05). Moreover, the Adjusted R Square is equal 17% which is mean that stock market liquidity and the other control variables explain 17% from the change of the stock market volatility. This result motivates further research in exploring more variables that may affect on the dependent variable stock market volatility.

The significance of the model in interpreting the changes in the dependent variable stock market volatility where ( $F = 3.279$ ) with significance (P-Value = 0.006) which is less than 0.05. Furthermore, the Durbin – Watson is significant because its value equal 2.312 which is greater than 2 this and VIF for all variables was less than 10 which is mean there is no multicollinearity. Therefore, we can accept the alternate hypothesis for H3 as follow: *There is a negative significant effect of stock market liquidity on stock market volatility.*

**4.3.2) The mediation role of the stock market liquidity:**

Table (10) shows the results of testing the mediating effect of stock market liquidity in the relationship between Investor sentiment and stock market volatility.

**Table (11): The results of testing the indirect relationships**

Independent	Mediator	Dependent	Indirect Effects	Total Effect	Sig.	Hypothesis result	Mediation
Investor sentiment	stock market liquidity	stock market volatility	-0.036	-0.157	0.001	Accepted	Partially Mediation

Source: prepared by the researcher based on the statistics results

As shown above from the table (11), and the results of the previous statistical method, according to (Baron & Kenny, 1986) rules of testing the mediators. We can find a significant relationship between investor sentiment and the stock market liquidity, beside a significant relationship between stock market liquidity and stock market volatility this mean that the stock market liquidity mediated the relationship between the investor sentiment and stock market volatility. In addition, the stock market liquidity partially mediating the relationship between Investor sentiment and stock market volatility because there is still a relationship

between investor sentiment and the stock market volatility regardless of the decrease in the value of beta. Therefore, H4 which represents the indirect effect of Investor sentiment on stock market volatility in the presence of the mediating role of stock market liquidity was fully accepted because the stock market liquidity is partially mediating the relationship.

### **5) Conclusion and Discussion:**

According to hypothesis one: According to DSSW model which showed that the investor behavior can't be expected and this eventually destabilize the stock markets especially when the investor deals with their feelings and expectations as a private information ( Barbries et al, 1998; Brown, 1991; DeLong et al, 1990). In this context, results showed that investor sentiment is significantly and negatively related to stock market volatility ( $\beta = -0.121$   $P < 0.05$ ). This result agreed with (Lee et al., 2002; Verma&Verma, 2007; Perez-Liston et al., 2016) who discovered a negative relationship between investor sentiment and volatility in developed markets such as the United States. Also, in emerging markets such as India, China, and Turkey, researchers noted a significant effect of sentiment on stock market volatility (Kimari & Makdud, 2015; Long et al., 2021; Chen et al., 2020; P.H&Rishad, 2020). Furthermore, Xindan and Bing, (2008) stated that the relationship between investor sentiment and volatility was negative. For more explanation, Lee et al., (2002) investigated the impact of noise traders on the formation of conditional volatility. They found that as investors' sentiment became more bearish, the volatility increased (fall) (bullish). In addition, Kimari and Makdud, (2015) observed a significant effect of investor sentiment on stock market volatility. The negative investor sentiments influenced volatility and supported the idea that the noise traders' pessimism made the market highly volatile. The psychological evidence that individuals with high (low) sentiment tend to make overly optimistic (pessimistic) judgments has been well-established along with the evidence on the effect of investor sentiment on asset prices (Mbage et al., 2019).

However, our findings were inconsistent with (Chen et al, 2020; Jiang & Jin, 2021; Uygyry &Tsu, 2014; Wang et al., 2022) who found a positive relationship between investor sentiment and volatility. They said that optimistic investor sentiment led to upward trends in volatility, and vice versa for pessimistic investors. Investors become afraid to sell during a period of low sentiment, which lowers volatility. However, as was already mentioned, long - lasting periods of low volatility give investors and policymakers overconfidence, which increases reliance on financial leverage and may eventually cause a financial crisis similar to the one that occurred in 2008.

Based on the preceding discussion, this finding fills the gap left by the DSSW model, which discovered a significant effect of investor sentiment on stock prices but did not explain how it occurred. For a clearer analysis, this study found that some individual investors in the Egyptian exchange lack adequate information about the products and services available in the market they rely on their feelings, as well as their expectations and beliefs, as a source of private information and make the investment decisions. So, in period on high sentiment investors feels optimistic and trust toward the stock markets so the volatility will decrease while in periods of uncertainty such as wars and pandemics the investors feel pessimistic toward the stock market and because of his desire for a return and his fear of suffering a loss in the future, his buying and selling may move more quickly, which raises the level of stock market volatility.

Hypothesis two stated that there is a significant effect of investor sentiment on stock market Liquidity. Although the noise traders depends mainly on price fluctuations to gain earnings (Amihud et al., 1991), called them liquid trader because they increase the trading volume and are regarded as a source of liquidity (Abudy, 2020; Baker & Stein, 2004; Deuskar, 2008; Schwert, 1990; Shleifer & Summer, 1990). Hence, it wasn't surprising that results showed a significant and positive relationship between investor sentiment and stock market liquidity ( $\beta = 0.257$   $P < 0.05$ ).

These findings support the theoretical framework of (Black, 1986; DeLong et al., 1991; Kumari et al., 2019; Kyle, 1985; Trueman, 1988), they demonstrated that the existence of noisy traders suggests that the stock market is liquid, and noise trading is a significant source of liquidity especially for riskier assets like stocks. In addition, the unjustifiable increase in liquidity levels was an indication of the dominance of a group of irrational noise traders (Abudy, 2020; Baker & Stein, 2004; Deuskar, 2008).

Our findings were consistent with, Lui et al., (2015) who found a positive relationship between investor sentiment and stock market liquidity. Also, Chui et al., (2018) concluded that psychological biases explained changes in stock market liquidity during financial crisis. So, optimism sentiment increased liquidity level, whereas pessimism decreased them.

Additionally, in emerging markets like Brazil, China, Indonesia, Mexico, Istanbul, the Philippines, Poland, South Africa, South Korea, Russia, Turkey, and Thailand, (Debate et al., 2018; Kumari et al., 2019) found that that when there was optimistic sentiment, trading volume increased and thus stock market liquidity increased, whereas when there was pessimistic sentiment, trading volume and thus stock market liquidity decreased.

As a result, this study found that investors who rely on the optimistic and pessimistic will buy short-term assets and resell them quickly to make high returns in the short term, which eventually increase the level of liquidity. So, despite the negative effects of investor sentiment, it is a considerable source of liquidity, especially in financial crises.

In addition, hypothesis three said that there is a significant effect of stock market liquidity on stock market volatility. Volatility and liquidity are indications of financial market quality because they aid in the creation of a good financial portfolio through accurate asset pricing and risk management (Bedowska-sojar&Kliber, 2019; Chung&chuwonganant, 2018). In addition, liquidity risk is seen as one of the primary explanations for stock return volatility ( Bagchi, 2016 ; Mittnik et al., 2015). Thus, liquidity shocks at the market or industry level influenced the liquidity level of an individual's assets, causing stock market volatility (Gold et al., 2017).

The results showed that stock market liquidity is significantly and negatively related to stock market volatility ( $\beta = -0.139$   $P < 0.05$ ). The inventory model can justify these results as it showed a negative relationship between liquidity and volatility. This model requires the investor to purchase short-term assets and hold them until price fluctuations occur, at which point they are sold. In this line, these findings agreed with (Xu et al., 2019; Cheriyaant &Lazra, 2019; Qiao et al., 2020) as they found a negative relationship between liquidity and volatility in emerging markets.

Unlike the findings in the developed markets because Chug and Chuwongant (2018) discovered that liquidity and volatility had a negative relationship. Bedowska-Soja and Kliber (2019) also found a bidirectional relationship between them. Also, (Bams and Honarvar, 2021; Chordia et al., 2003; Ramos and Righi, 2020) stated that stock market volatility is an antecedent of the stock market liquidity.

Liquidity has a significant effect on stock volatility in emerging markets like the Egyptian exchange. The market's ability to absorb volatility is reflected in its liquidity. In this vein, an efficient market has a high trading volume with low costs and low volatility, and the opposite is also true. Based on the above, this study came to the conclusion that stock market liquidity significantly affects how volatile stock prices are. Higher liquidity typically results in a less volatile market with less dramatic price fluctuations, whereas lower liquidity typically results in a more volatile stock market with more violent price fluctuations.

Finally, Results showed that stock market liquidity partially mediates the relationship between investor sentiment and stock market volatility. The presence of noise traders on the stock market leads to a high level of liquidity and raises risks, resulting in increased volatility. Two hypotheses can be used to justify the relationship between the three variables in this line: the mixture of distribution hypothesis and the sequential information arrival hypothesis. The first hypothesis is based on the idea that the flow of information and unexpected news can affect stock market prices on a daily basis. The second hypothesis stated that because not all traders receive the information at the same time, volatility and trading volume are likely to change (Escobari & Jafarinjad, 2019; Gupta et al., 2021; Liu & Gupta, 2021). Based on these hypotheses investor sentiment can cause asset prices to rise or fall beyond their fundamental value. Hence, the future expected cash flows and the risks connected with them cannot justify these changes in asset valuations (Paudel et al., 2022).

## **6) Recommendations:**

Policymakers should devise policies that maximize the benefits of information about investor sentiment, particularly in high trading volumes. These policies will also reduce the risks of "noise trading" and the aggressive fluctuation in prices.

As in practice, emerging financial markets are characterized by both high levels of synchronized stock price movement and high volatility compared to developed markets. These markets have frequent and unclear variances (Aggarwal et al., 1999). Unlike, institutional investors who have access to reliable information and capable to analyze information and make rational decisions, but individual (retail) investors do not acquire adequate reliable information and, in some cases, do not obtain it at all; they also do

not evaluate and analyze it properly, and as a result, they make irrational decisions (Nesma & Hisham, 2019). Unfortunately, individual investors also dominate emerging markets and usually have a significant influence on stock market movements (as previously clarified in the research problem). This is due to the fact that they possess limited financial knowledge, as well as their inability to access information easily and accurately compared to institutional investors. This may eventually lead to following other investors' action (Aouadi et al., 2013; Barbers et al., 2009; Sun et al., 2021).

Besides, investors want to invest in emerging markets because they are characterized by financial deregulation, rapid economic growth, and international diversification benefits (Vo & Battan, 2010). Investors in these markets can earn high abnormal returns in the short run, but they will eventually lose money in the long run.

Hence, in this section, the researcher presents a number of suggestions that will help individual investors and the stock market reach the desired rates of progress as follows:

**A) Recommendations for the individual investors:**

**Table (12)**

<b>NO.</b>	<b>The recommendation</b>	<b>The mechanism of application</b>
1	Foster the investor's social responsibility toward the investing environment.	Through Promoting advertising efforts and making people aware of the necessity of investing in the stock exchange rather than other risky channels that may expose them to fraud and theft.
2	Motivating people to arrange their personal finances.	Organization of an expert group to provide financial and economic advice to individual investors.
3	Improve investing awareness.	Providing financial literacy programs. These programs aim to provide the bare necessities of skills and knowledge to a wide range of people who are hesitant to invest in the stock market in order to make an informed decision. These programs include learning about returns and risks as well as managing personal income.
4	Launching the index of measuring investor sentiments in Egypt	The Egyptian exchange must develop indicators based on qualitative methods to measure investor sentiment toward the Egyptian exchange.

**Source:** Prepared by the researcher based on the study results.

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**B) Recommendations for the stock exchange management:**

**Table ( 13)**

<b>No.</b>	<b>The recommendation</b>	<b>The mechanism of application.</b>
1	Creating an investment-friendly climate	Promote and enhance the awareness about the available investment opportunities in Egypt exchange.
2	Improving stock exchange management practices.	Regulations should be modernized, and fees and taxes on liquidity should be reduced to overcome the stock market's lack of liquidity.
3	Lowering the level of uncertainty among Arab and foreign investors and the lack of knowledge reduces prospects for a true assessment of the financial markets.	Providing accurate information infrastructure for trading in the stock market to improve disclosure and transparency.
4	Increase the financial market depth.	Introduce new effective financial instrument and mechanisms.
5	Developing the skills of stock exchange workers.	focusing on their continuous development and training and adequately informing them on the consequences of the global financial crisis on stock markets in both developed and emerging economies
6	Strengthen the position of the stock exchange in the society.	Through expanding its contribution to social and economic progress.
7	Developing markets and assisting them with modern technical techniques.	Innovate simple brokers application for individual investors to help them in buying and selling stocks.

Source: Prepared by the researcher based on the study results.

**7) Study limitation and suggestion for the future research:**

**The current study has some limitations that point to future research directions as follows:**

A) The current research is a cross-sectional study that covers the years 2017 to 2021 and is based on the EGX-100 index. So, future studies will be able to conduct a longitudinal study based on daily stock prices over a longer period of time.

B) This study didn't concentrate on certain sector so the future research should emphasize on the effect of the investor sentiment, stock market liquidity and volatility on for example food industry sector or tourism sector.

C) In the current study, only direct measures of investor sentiment were used, with no consideration given to an indirect measure that included qualitative data regarding retail investor sentiment. As a result, future research must combine direct and indirect measurements to provide a comprehensive picture of investor sentiment.

D) This study found a partial mediation of stock market liquidity between investor sentiment and volatility, which means that there are still other variables that may affect this relationship, such as the moderating role of herding behavior in the relationship between investor sentiment and stock market volatility, the mediating role of the stock market liquidity on the relationship between herding behavior and stock market volatility, and The moderating role of financial literacy on the relationship between the investor sentiment and the financial volatility.

E) This study was limited to the Egyptian stock market; future studies should compare the study's findings to those of other emerging countries, such as the Chinese stock market, or developed markets, such as the American stock market. For example: the effect of the investor sentiment on the efficiency of Egyptian exchanges and the American stock market.

D) COVID- 19 and recent economic crises have imposed new constraints on local and global stock markets, so the researcher believes that future studies should concentrate on the role of COVID-19 on the investor sentiment and the consequences of this on liquidity, volatility, and risk tolerance.

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## الدور الوسيط لسيولة السوق في العلاقة بين ميول المستثمر وتقلبات سوق الأسهم

### دراسة تطبيقية على الشركات المقيدة في البورصة المصرية

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#### الملخص:

**الهدف:** سعت هذه الدراسة إلى معرفة تأثير ميول المستثمرين على تقلبات البورصة المصرية. وفي ضوء هذه العلاقة، تناولنا دور سيولة السوق في العلاقة بين ميول المستثمرين وتقلبات البورصة المصرية.

**المنهجية:** تبنت هذه الدراسة الفلسفة الوضعية، والمنهج الكمي، والمنهج الاستنتاجي. وتم الاعتماد على البيانات المالية للشركات المدرجة في مؤشر (EGX 100). هذا وبعد استبعاد البيانات المتعلقة بالبنوك والمؤسسات المالية، تكونت العينة من ٣٠٥ ملاحظة من ٧٦ شركة. تم تحليل تلك البيانات للتحقق مما إذا كانت السلاسل الزمنية هي سلسلة زمنية ثابتة أم لا باستخدام اختبار Dick-Fuller ونموذج GARCH. ثم استخدمنا معامل مصفوفة الارتباط والإحصاءات الوصفية لوصف البيانات. وأخيرًا، تم التحقق من صحة نموذج البحث باستخدام نمذجة المعادلة الهيكلية (SEM).

**النتائج:** انتهت الدراسة إلى وجود علاقة سلبية ذات دلالة إحصائية بين ميول المستثمرين وتقلبات سوق الأسهم. بجانب ذلك، تتوسط سيولة سوق الأسهم جزئيًا في العلاقة بين ميول المستثمرين وتقلبات سوق الأسهم.

**التوصيات:** بناءً على النتائج، وفي ضوء رؤية مصر (٢٠٣٠) تقدم هذه الدراسة مجموعة من التوصيات التي تساعد في تحسين أداء البورصة المصرية وتلقي الضوء أيضا على أهمية الاهتمام بالمستثمر الفرد. من خلال مثلًا تنمية مهارات العاملين بالبورصة وتعميق إدراكهم بتداعيات الأزمات المالية على سوق الأسهم، وتنمية المسؤولية الاجتماعية للبورصة من خلال المشاركة الفعالة في التنمية الاقتصادية والمجتمعية، وإطلاق حملات توعوية للمستثمرين الأفراد بأهمية تحسين مستويات المعرفة المالية لديهم وتبرز لهم أهمية عدم الانسياق خلف أي معلومات لا تعكس بدقة الوضع الحقيقي للبورصة المصرية.

**الكلمات المفتاحية:** ميول المستثمر، سيولة سوق الأسهم، التقلبات في سوق الأسهم، مؤشر

EGX100