Determinants of Herding Behavior in The Time Of COVID-19: The Case of Egyptian Stock Market Sectors

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Abstract

This research consists of two parts, the first part aims to study the Herding Behavior in the sectors of the Egyptian Stock Exchange, and the second part aims to study the factors that affect Herding behavior in accordance with the identification of those factors based on presentation of the previous literature on the Herding behavior, and those factors are represented in the exchange rate Stock trading volumes, stock returns, indicators of the spread of the corona virus, represented by the ratio of the total number of infections and deaths according to the population in Egypt. During the period from 1/3/2020 till 31/7/2020.

Key Words: COVID- 19, Herding Behavior, Stock market return, Exchange Rate, Sector, Trading Volume as an indicator of Liquidity, mimic.

1. Introduction

This Section Divided Into four Parts, It begins with an Introduction of Behavioral Finance, Which followed by a through presentation of Herd Behavior, and rational and irrational herding. The last part concerns the study's specific approach Measuring Herding Behavior.

1.1.Behavioral Finance

The Field of Behavioral Finance was introduced which (Schiller ,2003) describes as a mix of Finance, Social , science and psychology , it criticizes traditional Finance Theory, and it is a direct opposition to The Efficient Market Hypothesis (EMH) , The Cornerstone of many financial models **Ohlson** (2010).And this Behavioral Finance has grown toward the end of 20th Century as reaction of (EMH) **Özsu**(2015) , **Barber & Odean** (1999) claim that EMH condition rarely reflect the reality and evidence of real investor behavior and view Behavioral Finance as a new set of theories that allow investors to be irrational and markets to be inefficient , Thus help to attain deeper knowledge about financial markets.

According to **Shusha & Touny** (2016) many behavioral finance studies have addressed it as "Phenomenon of Deviations in the investors' decisions

from rational track which couldn't be explained by Classical Theory". and illustrate that as irrational behavior, taking into consideration that "Behavioral Finance not only about human actions, But also an understanding the reasoning patterns of investors including emotional factors involved to the extent of its influence in decision making. When we are speaking about investors' decision making we must concern not only on investors' decision making but also on financial markets which must affected by these decisions. As some market results may be different from that anticipated by traditional finance theories including *EMH* , These results can be explained by the behavioral biases affecting investors' decisions **Baker & Ricciardi** (2015) these explanations are provided for many inefficiencies and anomalies exhibited in financial markets and can't explained by theories of traditional finance , As this paper aims to Determine the " Determinants of Herding Behavior " , so we have to investigate the investment behavior of Market participants in Egyptian Stock Exchange , Specially with regard to their tendency to mimic the action of others or engage in Herd Behavior and study whether" Sector , Stock return , Exchange Rate, Trading Volume and Covid -19 " are Determinants of Herding.

1.2.The concept of herding behavior

The word Herding is basically from the word "Herd" describes the animal spirit to explain the naïve optimism and confidence in the capital market. Herd defined as "The behavior of investors who tend to imitate or follow the behavior of other investors (**Armansyah**, 2018).

According to **Ricciardi & simon** (2000) herding behavior is associated with people who (Blindly) following the decisions of others. **Lakonishok , shleifer & vishny** (1992) define the herding in the stock market as " The tendency of a group of many managers to buy(sell) stock , Specially at the same time , relative to what can be expected if the money managers itself doing trades and for herding.

So, when individuals imitate others in most decisions by passing their own judgment or decision, they how can all individuals claim to be rational. Herding is one of the important behaviors of human being which explain the deviation of human being from the rational decision making by following others **Yousaf , ali & shah** (2018).

In the existence of herding, the stock price will deviate from its intrinsic value, resulting in the inappropriate price **Dang & Lin** (2016) as a consequence, This intentional imitation will cause the market fragility, Excess volatility and systematic rise **Bikhchandani & Sharma** (2001).

From the above it can be said, there are a multiple definitions of herding, the following quote capture the essence of herding as will be discussed in this paper:

"In financial markets investors are influenced by others when deciding whether to participate in the market, which securities to trade, and whether to buy or sell. Such influences may cause investor behavior to converge…. To explain these phenomena various theoretical models have been proposed in the rational herding literature. For example cascade models show that investors optimally decide to ignore their own information and imitate previous investor actions." (**Bikhchandani et al**., 1992).

Several ideas mentioned in the quote above are important to understanding herding behavior in financial markets :

- Investors are influenced by others in making investment decisions (or decisions not to invest).
- Herding causes investors to imitate previous investor actions .
- As a result, investor behavior may converge.
- When herding behaviors occur investors may ignore available information.

According to the definitions that has been exposed a growing body of literature analysis herding in the stock market using measures of dispersion around the market return during periods of significant changes in stock prices **(Christie & Huang** ,1995), (**Chang et al**,2000), (**Caparrelli et al**,2004), **(Tan et al**,2008) .

The rationale is that if during these periods of market pressure movements of stock returns have the tendency to be more clustered , This is the evidence that there is co-movement of stock prices which is independent of their fundamental characteristics , according to (**Christie & Huang** ,1995), These periods are particularly informative because " a herd " is more likely to form under conditions of market stress, when individual investors tend to suppress their own beliefs and follow the market consensus . Cross sectional dispersions of return are predicted to be low when herd behavior is present.

Herd behavior can be a positive thing but it also have a negative impacts on the development of capital markets, Be a positive thing if such behavior by investors who have the precise information of the investment will make the market growth positive, Otherwise, will be negative or bad if wrong decisions

by investors lead to the destruction or financial crisis as happened in the capital market Argentina in 2000 to 2006 and also the financial crisis Asia in 1997 to 1998. Investors basically have a rational behavior in determining investment decisions. Those behavior would be seen if the stock price fell, the stock will be purchased and vise versa. However, in the presence of certain conditions such as a crisis, investors tend to behave irrationally (**Armansyah**, 2018).

1.3.Rational and Irrational Herding

Many of the definitions are proposed to detect herding behavior in literature. According to these definitions, there are two different forms of herding: first is rational herding and second is irrational herding. According to rational herd behavior perspective, herding behavior is associated with the situation in which investors are tried to restore their returns by ignoring voluntarily their own analysis; and replicate or follow another manager's decision who possesses a more reliable source of information or who has high level of analysis competencies of investment decisions (**Bikhchandani & Sharma** ,2000). Sometimes, it's more difficult to distinguish between irrational herding behavior and rational herding behavior. Most of the studies in literature have focused upon rational herding behavior. According to irrational herding perspective, herding behavior is associated with collective actions of individuals under uncertain conditions. The investors show herd behavior to reduce uncertainty and to increase their confidence in investment returns **(Devenow & Welch**, 1996), (**Yousaf et al**, 2018).

During periods of market stress that are usually characterized by high volatility flow of information (**Gleason et al**., 2004) and significant market changes, investors are willing to ignore their own beliefs and knowledge in order to follow the market consensus i.e. the herd (**Christie & Huang**, 1995),(**Lao & Singh,** 2011).

Under such extreme market situations investors are seeking the psychological safety of the herd and prefer collective action that will protect them from the painful feeling of regret coming from individual failure. Herding behavior is usually defined as" imitation that leads to correlated behavior patterns (**Bikhchandani et al**, 1992); (**Devenow & Welch**, 1996);(**Welch**, 2000); (**Hirshleifer & Teoh**, 2003); (**Gleason et al**, 2004) and it has been widely analyzed for several market participants (individual investors, institutional investors, fund managers, financial analysts) and financial markets (stock market, bond market, real estate market, commodities market, Exchange Traded Funds, Foreign Exchange market, futures market etc)".

Even though imitating might seem rational on the individual level, collectively this leads to herd behavior which is definitely irrational (**Shiller**, 2000). Interestingly, Posner (2009) argues that herding might be risky but not irrational, since the existing information asymmetry justifies the notion that someone else might have better information set. Herding can also be characterized as irrational (**Devenow & Welch**, 1996), coming from investors' psychology and several behavioral biases. In both cases, empirical evidence of herding in financial markets seriously questions market efficiency, having important implications for both individual and institutional investors. Market participants are exposed to the unpredictable herd behavior that may lead to significant stock price fluctuations and deviations from their fundamental values (**Christie & Huang**, 1995); (**Tan et al**., 2008); (**Chiang & Zheng**, 2010); (**Tseng**, 2010).

In that sense herding can cause or intensify existing crises, and finally lead to the formation of stock market bubbles (positive or negative) (**Caparrelli et al**, 2004); (**Gleason et al**, 2004), creating at the same time profitable opportunities (**Tan et al**, 2008). Profitable momentum strategies have also been attributed to herding (**Kang et al**, 2002). Market efficiency hypothesis is also violated since decision making may be seriously distorted when it is based on herding, causing a subsequent information loss (**Welch**, 1992); (**Bannerjee**, 1992). Herding behavior implies investors' irrationality, which is reflected in asset pricing, with a potential destabilizing effect for the market and the examination of herding can provide investors a better understanding of asset prices formation (**Lao & Singh**, 2011); (**Dasgupta et al**, 2011). Moreover, the significant asset returns co-movement that occurs in the presence of herd behavior clearly reduces the benefits of diversification (both domestic and international) and makes it necessary to hold a portfolio with a larger number of assets in order to achieve the desired diversification level, than in a market with lower asset returns' correlations (**Chang et al**, 2000); (**Chiang & Zheng**, 2010); **(Economou et al**., 2011). From a regulatory point of view, such coordinated investor behavior as well as cross-market herding could increase market volatility and finally pose a threat for market stability in general. Literature identifies the relationship between herding and market volatility (**Chang et al**., 2000); (**Tan et al**., 2008); (**Blasco et al**., 2012) further increasing financial system's fragility. Recently, (**Economou et al**., 2011) documented the existence of cross market herding in four stock 4 markets, the Greek, Italian, Portuguese and Spanish, that could have a potential destabilizing effect and could finally cause a regional financial crisis. In the same spirit, cross-market herding is also

closely associated with the concept of crisis transmission and financial contagion across international markets (**Karolyi & Stulz**, 1996); (**Bae et al**., 2003); (**Boyer et al**., 2006). Special focus has been placed on the continuously increasing role of institutional investors since their capital flows driven by herding behavior (**Hsieh et al**., 2011) may also considerably increase market volatility and pose a threat for the financial systems' stability (**Tsionas**, 2013).

"Even completely rational people can participate in herd behavior when they take into account the judgments of others, and even if they know that everyone else is behaving in a herd-like manner. The behavior, though individually rational, produces group behavior that is, in a well-defined sense, irrational".

The source of this irrational group behavior is, according to Shiller, information cascade, a concept discussed in the **Bikhchandani, Hirshleifer & Welch** (1992) paper. In a financial investment context information cascade occurs when investors' choices are influenced by those made by other investors rather than by information independently gathered by each investor. The irrationality suggested by Shiller is based on the fact that information cascades seem to have a life of their own and once initiated may cascade erroneous information. Shiller fears that persons who seek the easy path to investment strategies are likely to not "waste their time and effort in exercising their judgment about the market, and thus choose not to exert any independent impact on the market." Such persons may easily be attracted to the herd and, once recruited, susceptible to herd behaviors .

While there is general agreement about the emotional nature of investor herd behavior there is disagreement about the impact of the herds on the pricing of financial instruments. Analysts identify two basic different types of investors, noise traders and arbitrageurs.

Noise traders are thought to be irrational. They falsely believe that they have special information about the future price of an asset and, as a result, they exhibit the fallacy of excessive subjective certainty (**Alpert & Raiffa**, 1982). Noise traders often create herds by communicating their investment strategies through social interaction, frequently enabled by modern communication technology. They extend their collective bet against what rational traders consider to be the inherent value of a security. Noise trader action thus reinforces itself and the size of the herd increases(**Boehner & Gold**, 2013).

1.4.Measuring Herding Behavior

Our Measuring method builds on (**Christie & Huang**, 1995), (**Chang et al**., 2000) who proposed the Cross-Sectional Absolute Deviation (CSAD) and Cross-Sectional Standard Deviation (CSSD) as a herding indicators. These indicators measure the average distance between an individual stock return and market stock return, and help to ascertain whether an investors' decisions feature herding. If the investor decides to mimic the group's behavior in the period of heightened stock market volatility, individual stock return become less dispersed around the market, which lead to decline in (CSAD) and (CSSD).

The cross sectional standard deviation, CSSD, is measured with:

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

Where $R_{i,t}$ is the observed stock return of firm **i** at time **t**, **$R_{m,t}$** is the cross-sectional average return of the N returns in the market portfolio at time **t**, and **N** is the number of stocks in the portfolio.

To determine the presence of herd behavior a dummy variable technique is used. The CSSD returns are regressed against a constant and two dummy variables to identify the ex-treme market phases with the following formula:

$$\boldsymbol{CSSD_t = \alpha + b_1 D_t^L + b_2 D_1^U + e_t}$$

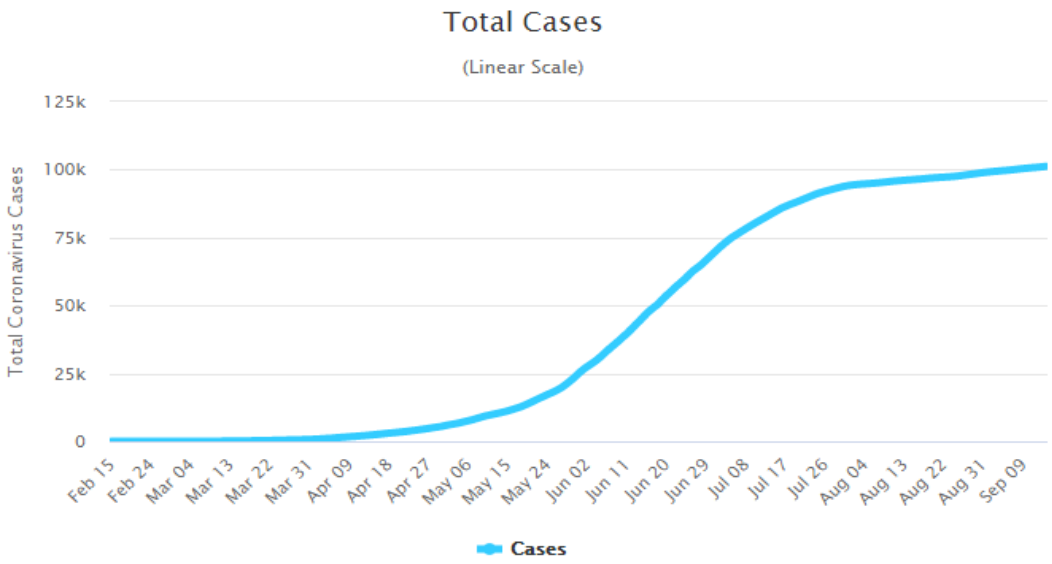
Where D^L is market with a "*1*" if the market return on day t lies in the extreme 1% and 5% lower or upper tails of the distribution of market returns, and marked "*0*" otherwise., where the boundaries of each dummy variable are marked. The dummy variables' function is to capture differences in herd behavior in ex-treme up or down periods versus relatively normal market periods. The **α** coefficient represent the average dispersion of the sample excluding the regions corresponding to the two dummy variables. Presence of herd behavior is determined by statistically significant negative values for b_1 or b_2. The rational is that **D^L** and **D^U** represents the dummy variables indicating extreme phases of the market return. If CSSD values are lower during these phases CSSD and **$R_{m,t}$** move in opposite direction indicated by a negative value of the Coefficient. For example, if b_1 or b_2 has a negative relation to the CSSD estimate, herd behavior is implied to be present. In that case it means that in the

most extreme market days the CSSD measure actually decreases (**Henker et al**., 2006).

Therefore, this research clarifies the determinants of herding behavior for the spread of the Corona virus in the Egyptian stock market sectors.

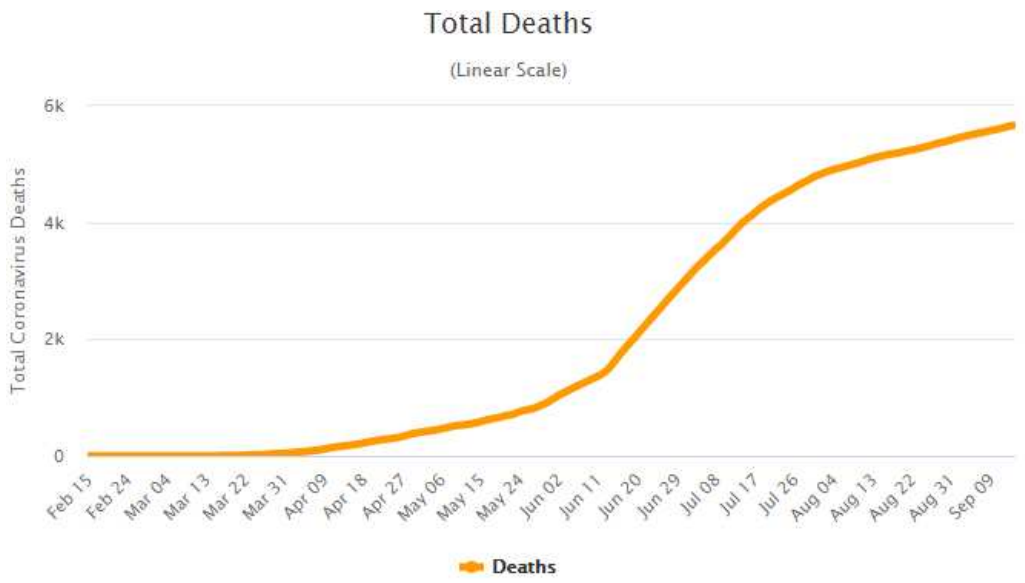
Figures (1) and (2) illustrate the developments of Coronavirus spread during the research period, as follows:

Figures (1): Total Corona virus Cases in Egypt



https://www.worldometers.info/coronavirus/country/egypt/

Figures (2): Total Corona virus Deaths in Egypt



https://www.worldometers.info/coronavirus/country/egypt/

- **Selecting a research sample**

The Egyptian Stock Exchange inaugurated the sectoral indices on January 2, 2020, in order to complete the usual comprehensive structure of the corporate sectors whose papers are restricted on the Egyptian Stock Exchange, with the purpose of developing the money market system by increasing the depth and raising the efficiency of the market in the market. The Egyptian Stock Exchange is committed to applying the best international practices in the field of managing stock market indices, starting with the criteria for selecting the companies that are eligible to join the index, the periodic review mechanisms and the mechanisms for calculating the index and publishing its data.The index is calculated in 1000 index. Sectoral indicators provide investors with the ability to measure the performance of the constituent companies for each sector according to the market capital weighted by free circulation, by no more than 35% for one company (**Elsayed & Elrhim**, 2020).

2. Literature review

The subject of the research has dealt with many studies and scientific messages that can be considered in the same context, and previous studies have been classified in terms of factors related to their impact on the behavior of the herd, studies related to each field are addressed as follows**:**

2.1. Herding behavior.
2.2. Herding behavior and Exchange rate.
2.3. Herding behavior and Crisis.
2.4. Herding behavior and Stock returns.
2.5. Herding behavior and Market sectors.
2.6. Herding behavior and trading Volume (Liquidity).

- **We review those studies as follows:**

2.1. Herding behavior

People tend to follow others to make identical investment decision when there is less publicly available information. This well-known phenomenon is "Herding ". Both investors and academic researchers have paid more attentions on herding in financial market over the recent past. Investors are interested in whether they can make profit by relying on collective information. Academic researchers also care about herding since it causes prices to deviate from fundamental values. Existing literature has two kinds of views about herding, either rational or irrational.(**Devenow & Welch**,1996) demonstrate that investors ignore their prior beliefs and follow others without any rational reason. On the other hand, according to (**Scharfstein & Stein**, 1990) managers do the

same investment actions as others rationally completely ignoring their own private information , in order to maintain reputation within the same evaluated peer group .

Researchers have proved herding from both theoretical models and empirical Studies. For theoretical models,(**Scharfstein & Stein**,1990) provide reputational herding behavior model , **Bikhchandani et al** .(1992) give information casades model , while **Banerjee** (1992) has sequential model . For empirical studies , Lakonishok, Shleifer and Vishny (LSV)Model of **Lakonishok et al**.(1992) and the Cross-Sectional Absolute deviation of returns (CCAD) Chang , Cheng and **Khorana** (2000) . are most 4 Commenly referred . **Lakonishok et al**.(1992) proposed the first methodology that has been sequentially widely used for empirical testing . they use (LSV) model to prove the potential herding effect of their trading on stock prices . **Christie & Huang**, (1995) examine the herding behavior by utilizing the Cross-Sectional Absolute deviation of returns (CCAD) as ameasure of the average proximity of individual asset returns to the realized market average in the US equity market .**Chang , Cheng & Khorana** (2000) extend the work of **Christie & Huang**, (1995) by proposing a new and more powerful approach to detect herding based on equity return behavior , which is the CSAD.(**Lan and Lai**, 2011).

In This Paper we use an emprical study like **Christie & Huang**, (1995), **Chang et al**, (2000) using The Cross- Sectional Standard Deviation (CSSD) as ameasure of the average proximity of individual asset returns to the realized market average in The general index of the Egyptian Stock Exchange EGX30, depending on Behavior the sectors of the Egyptian Stock Exchange

Filip, Pochea, & Pece (2015) this paper analyzed the existence of herding behavior of investors from emerging markets at industry level by using firm level information. The herding behavior of investors represents a major cause of speculative bubbles and implies that investors are taking similar trading decisions which may lead to deviations of the stocks' prices from their fundamental value. They have examined the presence of herding behavior on the CEE capital markets by using the CSAD statistical method proposed by Chang et al. (2000). Moreover, this paper highlighted the implications of different market conditions on the existence of herding behavior and finally, investigates the impact of the subprime financial crisis on the behavior of investors from CEE capital markets.

Chang et al, (2000) They examined the investment behavior of market participants within different international markets (i.e., US, Hong Kong, Japan,

South Korea, and Taiwan), specifically with regard to their tendency to exhibit herd behavior. They found no evidence of herding on the part of market participants in the US and Hong Kong and partial evidence of herding in Japan. However, for South Korea and Taiwan, the two emerging markets in our sample, documented significant evidence of herding. The results are robust across various size-based portfolios and over time. Furthermore, macroeconomic information rather than firm-specific information tends to have a more significant impact on investor behavior in markets which exhibit herding. In all five markets, the rate of increase in security return dispersion as a function of the aggregate market return is higher in up market, relative to down market days.

Chiang et al, (2010) this paper examined herding behavior in global markets. By applying daily data for 18 countries from May 25, 1988, through April 24, 2009, They found an evidence of herding in advanced stock markets (except the US) and in Asian markets. No evidence of herding is found in Latin American markets. Evidence suggests that stock return dispersions in the US play a significant role in explaining the non-US market's herding activity. With the exceptions of the US and Latin American markets, herding is present in both up and down markets, although herding asymmetry is more profound in Asian markets during rising markets. Evidence suggested that crisis triggers herding activity in the crisis country of origin and then produces a contagion effect, which spreads the crisis to neighboring countries. During crisis periods, They found supportive evidence for herding formation in the US and Latin American markets.

Bansal (2020)The COVID-19 pandemic has resulted in dramatic economic effects, characterized by excessive stock price volatility and a market crash. Some of the phenomena in effect during the crisis, such as the excessive volatility and the unshaken confidence of financial institutions, are insufficiently explained by the traditional finance paradigm. In this paper, they explore such phenomena from a behavioral finance lens and discuss some cognitive errors and biases relevant during and after the crisis - overconfidence (miscalibration, better-than-average effect, illusion of control, optimism bias), representation bias, risk aversion, herding behavior, and availability bias. They explore each of these phenomena from the perspective of psychology, and evaluate their relevance to financial institutions and markets and the COVID-19 induced global crisis.

Özsu (2015) Behavioral finance is a field that has grown toward the end of 20th century as a reaction to the efficient market hypothesis. This new field studies the effect of investor psychology on financial decisions and explains stock market anomalies in financial markets. Herding is such an anomaly that is defined as mimicking others' decisions or market trend. This study aimed to detect whether there is herding or not in Borsa Istanbul. To test the existence of

herding, stock returns traded on Borsa Istanbul and BIST 100 Index as market indicator are used. Data covers daily returns from 1988 to 2014 and intraday returns from 1995 to 2014. Firstly, herding is analyzed based on the methodology of cross-sectional dispersion of the stocks developed by **Christie & Huang** (1995), **Chang, Cheng & Khorana** (2000). The results indicated that there is no herding for both up and down markets for daily and intraday intervals in Borsa Istanbul. However, tendency of herding is higher in up markets.

To enhance and compare the results, the methodology based on the cross-sectional volatility of beta coefficients suggested by Hwang and Salmon (2004) is used. This methodology has provided evidence of herding in Borsa Istanbul. It is also observed that investors follow the market trend more in session two markets rather than session one markets. Thus, it is concluded that investors imitate the others more under normal market conditions rather than noisy market conditions. These results are consistent with the assumptions of **Hwang & Salmon** (2004).

Christie & Huang (1995) this study asked do equity returns indicate the presence of herd behavior on the part of investors during periods of market stress. To test this proposition, the cross-sectional standard deviation of returns, or dispersion, is used to capture herd behavior. When individual returns herd around the market consensus, dispersions are predicted to be relatively low. In contrast, rational asset pricing models predict an increase in dispersion because individual returns are repelled away from the market return when stocks differ in their sensitivity to market movements. The results for both daily and monthly returns are inconsistent with the presence of herding during periods of large price movements. For example, during extreme down markets, when herding is expected to be most prevalent, the magnitude of the increase in the dispersion of actual returns is mirrored by the increase in the dispersion of predicted returns that are estimated from a rational asset pricing model.

kizys, Tzouvanas & Donadelli (2020) They studied if government response to the novel corona virus COVID-19 pandemic can mitigate investor herding behavior in international stock markets. Their empirical analysis is informed by daily stock market data from 72 countries from both developed and emerging economies in the first quarter of 2020. The government response to the COVID-19 outbreak is measured by means of the Oxford COVID-19 Government Response Tracker, where higher scores are associated with greater stringency. Three main findings are in order. First, results show evidence of investor herding in international stock markets. Second, they documented that the Oxford Government Response Stringency Index mitigates investor herding behavior, by way of reducing multidimensional uncertainty. Third, short-selling restrictions, temporarily imposed by the national and supranational regulatory authorities of the European Union, appear to exert a mitigating effect on herding. Finally, results are robust to a range of model specifications.

Ohlson (2010) in this study the Stockholm Stock Exchange in Sweden is examined for herd behavior with a market wide approach. Three models, one created by **Christie & Huang** (1995) and the others created by **Chang, Cheng & Khorana** (1999), are applied to detect herd behavior from 1998 to 2009. Herd behavior is found in up-going market days, measuring on daily bases over the entire time frame. When breaking down the test period into annual sub periods, herd behavior is evident in the bullish markets of 2005 and 2007. In days with the most extreme market movements herd behavior is found in large cap stocks but not in the small cap. The result indicates a tendency of an increasing level of herd behavior over the measured period, which can be attributed to the increased influence of institutional ownership. Moreover, the data was adjusted for thinly traded stocks and the result is contradictive to previous studies. The reduction of thinly traded stocks seems to have an increasing effect on the herd-measure, implying that the presence of thinly traded stocks puts a negative bias on the herd-measures.

Kim, Chay & Lee (2020) this study explored the herding behavior of different types of investors (individual investors and both domestic and foreign institutional investors) and its impact on the volatility of individual stock returns. Intraday volatility and daily herding intensity of each investor type are measured using high-frequency transaction data containing detailed information on all executed orders in the Korea Exchange. This study realized regresses volatility on the herding intensity of each investor type and other control variables and found that herding of domestic and foreign institutions decreases realized volatility, whereas herding of individual investors increases it. This study also found that the destabilizing effect of individual investors' herding behavior is exacerbated on days of high market uncertainty, and the stabilizing effect of domestic institutions' herding is weakened on those days, whereas the stabilizing effect of foreign institutions' herding is not affected by the level of market uncertainty.

Decamps & Lovo (2002) showed that differences in market participants risk aversion can generate herd behavior in stock markets where assets are traded sequentially. This in turn prevents learning of market's fundamentals. These results are obtained without introducing multidimensional uncertainty or transaction cost.

Shusha & Touny (2016) recently, herd behavior earned the attention of researchers in the interpretation of the investment decision-making process in the financial markets. This study aimed to explore the attitudinal determinants of herd behavior of individual investors in the Egyptian Exchange. Examined four attitudinal determinants which include decision accuracy, hasty decision, overconfidence, and investor mood, and tested to what extent the effects of these determinants differ according to demographic characteristics of individual

investors such as gender, educational level, age, experience, and income. The results indicated that decision accuracy, hasty decision, and investor mood were the main attitudinal determinants that explain why individual investors follow herding behavior, but the effect of these factors may differ according to the investor's demographic characteristics.

2.2. Herding behavior and Exchange rate

A direct consequence of herd behavior and financial contagion are large and unpredictable exchange-rate swings, leading to high exchange-rate volatility. The paper goes on to deal with the adverse macroeconomic consequences of episodes with high exchange-rate volatility, especially in terms of market performance.

The literature has identified different kinds of herding, both rational and irrational. Concerning the former, the most important reasons for herding are information cascades, fixed costs of acquiring information and reputational concerns. Irrational herd behavior is usually explained by momentum trading strategies.

Information cascades are generally considered to be the most common explanation for herding. The typical setting of this kind of approach is provided by two crucial assumptions. First, there is private but imperfect information. However, investors also react to other actions. Second, a selling or buying wave by investors does not lead to corresponding price changes, essentially meaning that prices are fixed. This appears to be an implausible assumption for most assets. However, in the case of exchange rates it seems justified, given the high share of pegged exchange rates in emerging markets **(Belke & Setzer,** 2004**).**

Interest rate and foreign exchange rate are two important macroeconomic variables in open economics that significantly affect the stock market. Numerous studies have investigated the effects of interest rate variation or monetary policy shocks on stock returns **Thorbecke** (1997); **Bjørnland & Leitemo** (2009). Other studies have explored the relationship between exchange rate and stock returns (**Hau & Rey**, 2006); (**Cho, Choi, & Kim**, 2016). However, to the best of our knowledge(**Gong & Dai**, 2017), few studies have considered the effects of variations in interest and exchange rates on investor behavior at the micro-level. In this paper, we address this gap and examine whether the exchange rates is one of the Determinants of herding behavior in the Egyptian stock market.

Jiang & Verardo (2018) they uncover a negative relation between herding behavior and skill in the mutual fund industry. Their new, dynamic measure of

fund-level herding captures the tendency of fund managers to follow the trades of the institutional crowd. They found that herding funds underperform their ant herding peers by over 2% per year. Differences in skill drive this performance gap: ant herding funds make superior investment decisions even on stocks not heavily traded by institutions, and can anticipate the trades of the crowd; furthermore, the herding-ant herding performance gap is persistent, wider when skill is more valuable, and larger among managers with stronger career concerns.

Kim, Yoon & Kim (2004) The herd behaviors of returns for the won-dollar exchange rate and the KOSPI are analyzed in Korean financial markets. It is shown that the probability distribution P(R) of price returns R for three values of the herding parameter tends to a power-law behavior $P(R) \simeq R^{-\beta}$ with the exponents $\beta = 2.2$(the won-dollar exchange rate) and 2.4(the KOSPI). The financial crashes are found to occur at $h > 2.33$ when the relative increase in the probability distribution of extremely high price returns is observed. Especially, the distribution of normalized returns shows a crossover to a Gaussian distribution for the time step $\Delta t = 252$. Results will be also compared to the other well-known analyses.

Gong & Dai (2017) Interest rate and exchange rate are two important macroeconomic variables that exert considerable effects on the stock market. In this study, they investigated whether variations in interest and exchange rates induce herding behavior in the Chinese stock market. Empirical results indicate that interest rate increase and Chinese currency (CNY) depreciation will induce herding and this phenomenon is mainly manifested in down markets. Moreover, the herding level of the highest idiosyncratic volatility quintile portfolio is twice that of the lowest quintile portfolio which considers evidence of intentional herding. This result is consistent with those of previous studies, which report that retail investors prefer and overweigh lottery-type stocks. Finally, they investigated the effects of monetary policy announcements and extreme exchange rate volatility on herding because these events elicit considerable public attention and may trigger collective behavior in the aggregate market.

Kohler (2010) Exchange rate movements during the global financial crisis of 2007–09 were unusual. Unlike in two previous episodes – the Asian crisis of 1997–98 and the crisis following the Russian debt default in 1998 – in 2008 many countries that were not at the center of the crisis saw their currencies depreciate sharply. Such crisis-related movements reversed strongly for a number of countries. Two factors are likely to have contributed to these developments. First, during the latest crisis, safe haven effects went against the typical pattern of crisis-related flows. Second, interest rate differentials explain more of the crisis-related exchange rate movements in 2008–09 than in the past.

This probably reflected structural changes in the determinants of exchange rate dynamics such as the increased role of carry trade activity.

Caporale, Economou & Philippas (2008) this paper examined herd behavior in extreme market conditions using data from the Athens Stock Exchange. They tested for the presence of herding as suggested by **Christie & Huang** (1995), **Chang, Cheng & Khorana** (2000). Results based on daily, weekly and monthly data indicate the existence of herd behavior for the years 1998-2007. Evidence of herd behavior over daily time intervals is much stronger, revealing the short-term nature of the phenomenon. When the testing period is broken into semi-annual sub-periods, herding is found during the stock market crisis of 1999. Investor behavior seems to have become more rational since 2002, owing to the regulatory and institutional reforms of the Greek equity market and the intense presence of foreign institutional investors.

Demirer & kutan (2006) this paper examined the presence of herd formation in Chinese markets using both individual firm- and sector-level data. They analyzed the behavior of return dispersions during periods of unusually large upward and downward changes in the market index. They also distinguished between the Shanghai and Shenzhen stock exchanges at the sector-level. Their findings indicated that herd formation does not exist in Chinese markets. They found that equity return dispersions are significantly higher during periods of large changes in the aggregate market index. However, comparing return dispersions for upside and downside movements of the market, we observe that return dispersions during extreme downside movements of the market are much lower than those for upside movements, indicating that stock returns behave more similarly during down markets. The findings support rational asset pricing models and market efficiency. Policy implications of the results for policymakers are discussed.

Tsionas (2013) examined herding behavior in the US stock market, employing 30 blue chip companies of the Dow Jones Industrial Average Index, through 2001-2011. Proposed a novel multivariate stochastic volatility methodology extended to allow for common factors that detect and measure the contribution of herding conditional on stylized-fact features of returns. And documented the existence of herding during the recent global financial crisis and its aftermath. Results had important policy implications and highlight the significant changes encountered by the global financial system as well as the increased systemic risk market participants are exposed to.

Dasgupta, Prat & Verardo (2011) in this paper they developed a simple theoretical model to analyze the impact of institutional herding on asset prices. A growing empirical literature has come to the intriguing conclusion that

institutional herding positively predicts short-term returns but negatively predicts long-term returns. They offer a theoretical resolution to this dichotomy. In their model, career-concerned money managers interact with profit-motivated proprietary traders and security dealers endowed with market power. The reputational concerns of fund managers imply an endogenous tendency to imitate past trades, which impacts the prices of the assets they trade. Showed that institutional herding positively predicts short-term returns but negatively predicts long-term returns. In addition, their paper generated several new testable predictions linking institutional herding, trade volume, and the time-series properties of stock returns.

2.3. Herding behavior and Crisis

The outbreak of the novel corona virus COVID-19 in January 2020 has triggered a public health emergency of international concern and has exacerbated national health systems across the globe. Although the corona virus crisis has become a major threat to particularly vulnerable members of the society, governments in both developed and emerging market countries have responded with a varying degree of stringency to save lives and alleviate growing pressures on their health sectors. In general, the 'gold command', elaborated by government strategists, has envisaged school and workplace closures, social distancing measures, and travel restrictions, along with fiscal stimulus packages and aggressive monetary expansions, to mention just few.

Nevertheless, the flip side of the coin had become an eye-opener for policy markets, politicians and financial regulators. Namely, the corona virus crisis is predicted to descend into a business cycle recession and a global financial crisis. As a result, stock market investors have succumbed to the growing uncertainty surrounding the economy and the financial system and have instigated massive sales of risky assets (**Baker et al**, 2020b); (**Ramelli & Wagner**, 2020). In periods of financial market jitters and heightened uncertainty (**Schmitt & Westerhoff**, 2017), particularly of multiple dimensions (**Avery & Zemsky**, 1998), investors have a tendency to mimic decisions of their peers, i.e., follow the crowd (**Kurz & Kim,** 2013).

Against this background, this paper **(Kizys et al,** 2020**)** seeked to determine whether is there evidence of investor herding behavior in international stock markets during the coronavirus crisis? But we concentrate on Egyptian Stock Exchange

To address these questions, our methodology builds on **Christie & Huang** (1995) and **Chang et al** (2000), who proposed the cross-sectional absolute

deviation (CSAD) and the cross-sectional standard deviation (CSSD) as herding indicators. These indicators measure the average distance between an individual stock return and the market return and help to ascertain whether an investor's decisions feature herding. If the investor decides to mimic the group's behavior in periods of heightened stock market volatility, individual stock returns become less dispersed around the market return, which leads to a decline in the CSAD and CSSD **(Kizys et al,** 2020).

Armansyah (2018) Indonesia is one of an emerging country in Asia. As an emerging country, Indonesian capital markets attract the investor from around the world to make investment. Investment require good, clear information and trustworthy to make decision. The information that investor received may vary to other investor. These differences could lead to herd behavior. Good herd behavior will lead to economic growth otherwise will lead to crisis. These researches examined the effect of herd behavior of investors to the financial crisis of 2008 and 2013 of the Indonesian capital market. Variables used in this research is financial crisis was measured using Exchange Market Pressure Index (EMPI) and herd behavior measured with LSV formula. The method used is a model of Vector Auto Regression (VAR) with a stationary test phase, co-integration test, VAR estimations, impulse response analysis, analysis of variance decomposition, and causality test. The findings is indicate that investors in Indonesia stock market has irrational behavior that leads to herd behavior, especially during financial crisis furthermore, herding behavior affecting the occurrence of financial crisis in Indonesia. These findings provide knowledge about the effect of herding behavior in financial crisis Indonesia and provide input for academics in the field of behavioral finance management, especially in the development of capital markets and for investors to give feedback on the importance of the behavior of investors in the Indonesian capital market.

Kizys et al (2020) they studied if government response to the novel corona virus COVID-19 pandemic can mitigate investor herding behavior in international stock markets. Our empirical analysis is informed by daily stock market data from 72 countries from both developed and emerging economies in the first quarter of 2020. The government response to the COVID-19 outbreak is measured by means of the Oxford COVID-19 Government Response Tracker, where higher scores are associated with greater stringency. Three main findings are in order. First, results showed evidence of investor herding in international stock markets. Second, we document that the Oxford Government Response Stringency Index mitigates investor herding behavior, by way of reducing multidimensional uncertainty. Third, short-selling restrictions, temporarily

imposed by the national and supranational regulatory authorities of the European Union, appear to exert a mitigating effect on herding. Finally, results are robust to a range of model specifications.

Yousaf et al (2018) this study examined herding behavior in the Pakistani Stock Market under different market conditions, focusing on the Ramadan effect and Crisis period by using data from 2004 to 2014. Two regression models of **Christie & Huang** (1995), **Chang et al** (2000) are used for herding estimations. Results based on daily stock data revealed that there is an absence of herding behavior during rising (up) and falling (down) market as well as during high and low volatility in market. While herding behavior is detected during low trading volume days. Yearly analysis shows that herding existed during 2005, 2006 and 2007, while it is not evident during rest of the period. However, herding behavior is not detected during Ramadan. Furthermore, during financial crisis of 2007–08, Pakistani Stock Market exhibits herding behavior due to higher uncertainty and information asymmetry.

Omay & Iren (2016) this study investigated the effects of crises on domestic and foreign investors' behaviors by utilizing a nonlinear approach. Considering the nonlinearity inherent in many financial variables, this study proposes an appropriate econometric modelling for analyzing the investors' behavior, particularly during turbulent times. Specifically, STAR-STGARCH family models and generalized impulse response function analysis (GIRF) are employed to understand the different reactions of foreign and domestic investors at the Malaysian Stock Exchange market during the 1997 Asian crisis. The results of the model and the GIRF analysis have shown that foreign investors exhibited a herding behavior during the crisis and responded the shock more quickly than the domestic investors. When the same analysis is applied to understand the effects of the 2008 Subprime Mortgage Crisis in the Malaysian market, the behaviors of foreign and domestic investors are found to be very similar.

Caporale et al (2008) this paper examined herd behavior in extreme market conditions using data from the Athens Stock Exchange. They test for the presence of herding as suggested by **Christie & Huang** (1995), **Chang**, **Cheng**, **& Khorana** (2000). Results based on daily, weekly and monthly data indicate the existence of herd behavior for the years 1998-2007. Evidence of herd behavior over daily time intervals is much stronger, revealing the short-term nature of the phenomenon. When the testing period is broken into semi-annual sub-periods, herding is found during the stock market crisis of 1999. Investor behavior seems to have become more rational since 2002, owing to the

regulatory and institutional reforms of the Greek equity market and the intense presence of foreign institutional investors.

Allam, Abdelrhim, & Mohamed (2020) this paper aimed to study the effect of coronavirus on the trading behavior of both individual and institutional investors in the Egyptian Stock Exchange, as the spread of the Coronavirus was measured by indicators reveal the virus spread in the Arab Republic of Egypt by using (Daily cases, total cases, daily deaths, total deaths) On a daily basis as independent Variables, And dependent variable represented in investors' trading behavior measured by The daily trading volumes of (Egyptians, Arabs& Foreign investors) for both " individual and Institutions and measured through the difference between buying and selling transactions in the Egyptian stock market. Applied daily from March 1, 2020, to June 30, 2020.**The results indicate** that the trading behavior of individual and institutional investors for Egyptians, Arabs, and foreigners appears to be sensitive to the spread of the Coronavirus. were the most influential and sensitive independent variables in the dependent variable, the Daily Deaths variable was more effective and sensitive for individuals and institutions for Egyptian investors, and for Arab investors, the Daily Cases variable was more sensitive to the trading behavior of Arab individual investors. , And the (Total Cases) variable is more sensitive to the behavior of trading of Arab institutions, and for foreign investors, the variable (Daily Deaths) was more sensitive to the behavior of foreign individual investors, and the variable (Total Deaths) was more sensitive to the behavior of foreign institutions. The results also showed that Significant differences were statistically significant for the volume of investors' trading in the Egyptian Stock Exchange, due to the high value of the trading averages of Egyptian individuals, then foreign individuals and finally Arab individuals, as the results show an increase in the value of the averages of trading in Egyptian institutions, then Arab institutions, and finally foreign institutions.

2.4. Herding behavior and Stock returns

During periods of abnormally large average price movements, or market stress, the differential predications of rational asset pricing models and herd behavior are most pronounced .specifically, because individual securities differ in their sensitivity to the market return, rational asset pricing models predict that periods of market stress induce increased levels of dispersion. In contrast , The herding of individuals around the market translates into a reduced level of dispersion(**Christie & Huang**, 1995).

Teh & Bondt (1997) the purpose of this research was to evaluate the cross-sectional relationship between expected returns, trading practices, volatility, and standard measures of investment risk (beta, market value, and the market-to-

book ratio). Ceteris paribus, does high trading volume raise share prices? Does it increase price volatility? Does the identity of investors (individual investors vs. banks, insurance companies, mutual funds, or money management companies) matter to the level of prices? Do regulatory restrictions qualify conclusions? They employ price and volume data for individual U.S. firms over twenty years (1970-1990). In addition, institutional ownership data are available since 1979. Their analysis is based on monthly returns. This choice is driven by data requirements and convenience. It allowed them to focus on issues of asset pricing rather than the financial economics of market micro-structure.

Christie & Huang (1995) their question was Do equity returns indicate the presence of herd behavior on the part of investors during periods of market stress? To test this proposition, the cross-sectional standard deviation of returns, or dispersion, is used to capture herd behavior. When individual returns herd around the market consensus, dispersions are predicted to be relatively low. In contrast, rational asset pricing models predict an increase in dispersion because individual returns are repelled away from the market return when stocks differ in their sensitivity to market movements. The results for both daily and monthly returns are inconsistent with the presence of herding during periods of large price movements. For example, during extreme down markets, when herding is expected to be most prevalent, the magnitude of the increase in the dispersion of actual returns is mirrored by the increase in the dispersion of predicted returns that are estimated from a rational asset pricing model.

Zaremba, Szyszka, Karathanasopoulos& Mikutowski (2020) this paper showed that market breadth, i.e. the difference between the average number of rising stocks and the average number of falling stocks within a portfolio, is a robust predictor of future stock returns on market and industry portfolios for 64 countries for the period between 1973 and 2018. They link the market breadth with herd behavior and show that high market breadth portfolios significantly outperform low market breadth portfolios, and that this effect is robust to effects such as size, style, volatility, skewness, momentum, and trend-following signals. In addition, the role of market breadth is particularly strong among markets characterized by high limits to arbitrage, following bullish periods, and in collectivistic societies, supporting behavioral explanations of the phenomenon. They also examined practical implications of the effect and our results indicate that the effect may be employed for equity allocation and market timing, although frequent portfolio rebalancing can lead to higher transaction costs that may affect profitability.

Gutierrez & Kelley (2009) when the trading of institutional investors is imbalanced between buys and sells, how are stock prices affected? The extant literature on such herding by institutions, represented by **Wermers** (1999), **Sias** (2004), concluded that herding promotes price discovery and helps adjust prices to their intrinsic levels. That is, they find herding to correctly predict stock returns in the coming months. In contrast, two to three years after the herding, we find that stocks with buy herds realize negative abnormal returns. This longer run reversal in returns is robust across subperiods and performance metrics and impedes the interpretation of herding as solely promoting price discovery. In addition, in this study they found that non-13F investors, roughly labeled individual investors, suffer these longer run reversals in returns. The performances of the herding and no herding institutions are less clear. On the sell side, however, herding does not explain future abnormal returns.

2.5. Herding behavior and Market sectors

In the traditional finance , it's assumed that markets are efficient and investors are rational , But in behavioral Finance , markets are not efficient and investors are normal people who may be affected by cognitive problems(**Statman**, 2014) ; these Cognitive problems include over and under confidence, over- reaction , cognitive bias , and herding, **Shafi & Review** (2014) . The problem is herding behavior may increase volatility and affect stability and efficiency of financial markets(**Shusha et al,** 2016) .

The specific problem is that most of studies about herding were conducted at the market level ignoring the behavior at sector level which may lead to incorrect conclusions about its presence(**BenSaïda**, 2017) , (**Elshqirat**,2019).

The presence of herding behavior may be misjudged if studied at market level because herding may not affect all sectors in the market but instead, affect those sectors with specific investors' attributes, **So** Testing the presence of herding behavior in Egyptian Stock Exchange may help in explaining why the prices of stocks cannot be predicted using traditional pricing models and may provide investors with more information about the stocks are being priced in The Egyptian market.

Elshqirat (2019) The main purposes of this quantitative study were to examine the existence of herding behavior among investors in Amman stock exchange (ASE) at market and sector level in addition to testing the behavior during the market rising and falling and examining whether the behavior existence is different before and after the global financial crisis of 2008. The theoretical base of the study was the behavioral finance which assumes that investors are not completely rational and they may follow others when taking investment decisions. The main enquires of the study were about the existence of herding in the Jordanian market, whether it's affected by conditions of market rising and falling, and whether it's affected by the financial crisis. A quantitative

design was employed to achieve the purposes of this study which covers the period 2000 - 2018. Data were obtained from ASE website and analyzed using ordinary least squares method. The results indicated that herding is absent in the Jordanian market if tested at market level while it exists in services and industrial sectors if tested at sectors level. The financial crisis did not affect the presence of herding at market level while it did affect the behavior in services and industrial sectors. Moreover, the results revealed that market condition of rising and falling affected herding at market level but not at sectors level. It is also concluded that the global financial crisis changed the presence of herding behavior during conditions of rising and falling in market and in each sector.

Tsionas (2013) This Study examined herding behavior in the US stock market, employing 30 blue chip companies of the Dow Jones Industrial Average Index, through 2001-2011. Proposed a novel multivariate stochastic volatility methodology extended to allow for common factors that detect and measure the contribution of herding conditional on stylized-fact features of returns. it documented the existence of herding during the recent global financial crisis and its aftermath. Its results had important policy implications and highlighted the significant changes encountered by the global financial system as well as the increased systemic risk market participants are exposed to.

Elsayed & Elrhim (2020) This paper attempted to investigate the effects of COVID-19 spread on Indices Sectoral of The Egyptian Exchange .Corona virus spread has been measured by “Corona virus cases” and “Corona virus deaths” on daily basis. Besides, it’s measured by each of “new Corona virus cases” and “new Corona virus deaths”, in terms of Egypt's population. The dependent variable reflects the response of the Egyptian sectoral indicators to the spread of the Corona virus and is measured by the returns of the daily sectoral indicators for the Egyptian stock market. This has been applied on daily basis over the period from March 1, 2020 till May 10, 2020.

Results indicated that the return of the stock market sectors seems to be more sensitive to cumulative indicators of mortality than daily deaths from corona virus, and new cases more than cumulative cases of corona virus. The coefficient of determination between the independent variables and the variable belonging to 4 sectors is (IT, Media & Communication Services 0.393, Industrial Goods, Services and Automobiles 0.470, Health Care & Pharmaceuticals 0.327, Basic Resources 0.266).

2.6. Herding behavior and trading Volume (Liquidity)

Another motivation arises from the important effect of liquidity on herding on stock market. A growing numbers of literatures suggest that liquidity can predict stock returns in both firm level and market level. Indeed **(Amihud,** 2002)claims that the movement in liquidity can forecast the aggregate return ; in other words , liquidity can be a market sentiment indicator . An abnormal liquid

market implies that the asset's price is dominated by irrational investors.for example, high liquidity donates the sentiment of these irrational investors is positive which can be the basis of herding in the following kkperiod. On the opposite effect it has been argued that following the action of others are intensifying the trading of particular stocks; leading to unusually high liquid level. Hence, market liquidity is likely to be a vital factor to fuel herding movement and contributes to explaining herding propensity in equity market. This motivates us to add liquidity to the herding model to investigate the effect of one factor on another factor (**VO, Phan, Dang, & Vietnam,** 2016)

Vo et al (2016) this paper focused on investigating the relation between herding and liquidity in Vietnam stock market, an issue which is paid less intention in previous studies. They use stock prices and trading volume over the period from 2005 to 2017 as the data set to measure herding and liquidity, respectively. The finding indicates the presence of herd behavior in Vietnam stock market during the period studied. Moreover, the results reveal significant evidence of herding asymmetry conditional on the average market liquidity but more pronounced for high and medium liquidity stocks. In addition, there is empirical evidence supporting the two-way directional effect of herding and market liquidity. The results also robust when we split the data into three sub periods including pre-crisis, during crisis and post-crisis periods.

Ibbotson, Chen, Kim & Hu (2013) they first showed that liquidity, as measured by stock turnover or trading volume is an economically significant investment style that is distinct from traditional investment styles such as size, value/growth, and momentum. Then introduce and examine the performance of several portfolio strategies, including a Volume Weighted Strategy, an Earnings Weighted Strategy, Earnings-Based Liquidity Strategy, and a Market Cap Based Liquidity Strategy. Their back test research shows that the Earnings-Based Liquidity Strategy offers the highest return and the best risk-return tradeoff, while the Volume Weighted Strategy does the worst. The superior performances of the liquidity strategies are due to equilibrium, macro, and micro reasons. In equilibrium, liquid stocks sell at a liquidity premium and illiquid stocks sell at a liquidity discount. Investing in less liquid stocks thus pays. Second, at the macro level, the growing level of financialization of assets in the world makes today's less liquid securities increasingly more liquid over time. Finally, at the micro level, the strategy avoided, or invested less, in popular, heavily traded glamour stocks and favors out-of-favor stocks, both of which tended to revert to more normal trading volume over time.

Laakkonen (2015) this paper studied the impact of uncertainty on the investors' reactions to news on macroeconomic statistics. With daily data on realized volatility and trading volume, They showed that the investors in the US Treasury bond futures market react significantly stronger to US macroeconomic news in times of low macroeconomic, Financial and political uncertainty. They also found that investors are more sensitive to the uncertainty in the financial market compared to the macroeconomic and political uncertainties. Their results might partly explain the sudden freeze and low liquidity in some financial markets during the latest financial crisis.

Lan & Lai (2011)this study modified the cross-sectional absolute deviation of returns (CSAD) of **Chang**, **Cheng & Khorana** (2000) by adding trading volume variable and found significant evidence of herding in the Hong Kong stock market using daily data. Specifically, higher trading volume induces more herding. Moreover, while proven as a long-lived phenomenon, herding cannot generate positive market returns. On the other hand, positive market returns are the basis of herding. In addition, there is no evidence supporting the notion of cross-market herding information between the Hong Kong stock market and the Chinese stock market. However, the return information from one market will influence the herding behavior on another market. They added to the literature of herd behavior by introducing trading volume to explaining the CSAD.

Boehner & Gold (2013) the presence of investor herding behavior for DOW firms is analyzed for the years 2005 to 2009 through an examination of trading volume. They examined whether herding investors behave in a way similar to the diffusion of new products into consumer and commercial markets. and hypothesized that herding is viral and that the behavior of herding investors can be modeled by applying the principles of the Bass Model, a respected theory in the fields of marketing and technology management. Herding starts with influential investment initiators (called innovators in the Bass Model) who attract early imitators, who in turn attract later imitators. Their results showed that this behavior is consistent with the behavior of financial market investors, and that the significance and degree of herding has increased over time. This finding has important implications for stock market stability and for the strategies of investment analysts.

- **Research Motivation**

Our paper is motivated by a number of reasons :

- Investigating whether is there a herding behavior in Egyptian Stock Exchange in the period from 1/3/2020 till 31/7/2020, Taking into

consideration The Covid-19 pandemic , As herd is more likely to form under conditions of Market Stress (**Caporale et al**, 2008).

- Examine the Herding Behavior during Crisis Period.
- Distinguish between Rational and irrational herding.
- Investigate whether Stocks' returns, Exchange Rate, Trading Volume as a measure of Liquidity, Sectors and Covid -19 act as determinants of Herd Behavior.

3. Measuring Variables and Developing Hypotheses

3.1. The dependent variable reflects the response of the herd behavior and is measured by the daily cross-sectional standard deviation of the Egyptian stock market.

3.2. The independent and determinant variables of the dependent variable were measured as follows:

- The spread of the Corona virus has been measured through "cumulative cases" and "cumulative deaths" in terms of the population of Egypt, which are on a daily basis.
- The sector index returns for the Egyptian stock market were measured by the daily rate of change of the sectors 'returns.
- The trading volume of the companies in the Egyptian stock market sectors was measured by collecting the daily trading volumes of all companies in the sector.
- The exchange rate in the Arab Republic of Egypt was measured by the daily purchase rate of the Central Bank of Egypt.

Table (1) illustrates the research variables

Dependent variable	Calculation	Sign
Herding Behavior	Cross-Sectional Standard Deviation (CSSD)	**HB**
Stock Market Return	Δ of market index m at the end of day n	**SMR**
Exchange Rate	Ln of The daily purchase rate of the exchange rate	**ER**
Sector Trading Volumes	Ln of Total daily trading volumes for companies in the sector index	**STV**
Relative Corona virus Cumulative Cases	Ln of Cumulative Corona virus Cases (per million of population)	**RCCC**
Relative Cumulative Corona virus Deaths	Ln of Cumulative Corona virus Deaths (per million of population)	**RCCD**

Data obtained from: https://www.egx.com.eg/ar/MarketWatchSectors.aspx
Data obtained from: https://www.worldometers.info/coronavirus/country/egypt/

3.3. This paper aims at testing the following four hypotheses

3.3.1. There's no herd behavior in the cases of buying and selling for companies operating in the Egyptian Stock Exchange sectors.

3.3.2. This research has been based on the above presented on the assumption that there is a relationship between the independent

variables and the dependent variable represented in the Herd Behavior, and those assumptions can be formulated as follows: -

- There's no significant effect of "Stock Market Return" on "Herding Behavior ".
- There's no significant effect of "Exchange Rate"on "Herding Behavior "
- There's no significant effect of "Sector Trading Volumes" on "Herding Behavior ".
- There's no significant effect of "Corona virus Cumulative Cases" on" Herding Behavior ".
- There's no significant effect of "Cumulative Corona virus Deaths" on" Herding Behavior ".

This means that alternative hypothesis

H_a: β # 0 versus null hypothesis H_b: β = 0,

Where β is the regression coefficient of the following functions:

Estimation Equation

- $\mathbf{HB = \alpha + \beta_1 SMR + \beta_2 ER + \beta_3 STV + \beta_4 RCCC + \beta_5 RCCD + \varepsilon}$

3.4.Descriptive and diagnostic statistics

The following tables show the descriptive statistics of the independent research variables determinant for herding behavior during the period from 1/3/2020 to 7/31/2020. The results are as follows:

Table (2): Descriptive statistics of research variables

Variables	SMR	ER	STV	RCCC	RCCD
Mean	-0.001425	1.199468	5.272147	0.0002880	0.0000131
Median	4.83E-05	1.195869	6.704639	0.0001150	0.0000060
Maximum	0.064581	1.208664	8.066099	0.0009190	0.0000470
Minimum	-0.081034	1.192668	0.66674	0.0000000	0.0000000
Std. Dev.	0.019505	0.004936	2.493544	0.0003220	0.0000151
Skewness	-0.805842	0.590724	-1.041908	0.7754510	1.0090490
Kurtosis	5.064251	1.837424	2.50822	2.0135050	2.5474240
Observations	490	490	490	765	765

Source: Outputs of data processing.

4. Testing Hypotheses

Test First Hypothesis: Testing herding behavior:

According to **Demir & Solakoglu** (2016), studies that tested herding behavior belong to two groups; one of these groups is concerned with finding an explanation for the behavior of copying the decision of other investors while the other is focused on the cross-sectional standard deviation (CSSD) of dispersion of returns and the cross-sectional absolute deviation (CSAD) of returns. This

study belongs to the first group which uses the CSSD to detect the presence of herding among investors.

If herd behavior is present then dispersion decreases, since returns to individual stocks are collected around the market return.

As investors routinely act in periods of stable stock market phases, but they act irrationally and flock in stages of crisis in terms of market movements, and if herd behavior is present, the dispersion between sector returns and market returns decreases. CSSD transverse standard deviation is measured by the following equation:

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

By applying this equation to all sectors of the Egyptian Stock Exchange, as the Egyptian Stock Exchange General Index EGX30 represents the market return, results were as follows:

Table (3): Results of the herding behavior test in the Egyptian Stock Exchange sectors during the period from 1/3/2020 to 31/7/2020

	sectors	Companies in the index	CSSD
1	Basic Resources	16	0.412%
2	Banks	12	0.579%
3	Travel & Leisure	10	0.655%
4	Health Care & Pharmaceuticals	14	0.671%
5	Food, Beverages and Tobacco	24	0.716%
6	Industrial Goods , Services and Automobiles	5	1.155%
7	Real Estate	31	1.302%
8	Non-bank financial services	20	1.561%
9	Building Materials	14	1.563%
10	Shipping & Transportation Services	4	1.588%
11	Trade & Distributors	4	2.112%
12	Textile & Durables	7	2.166%
13	Education Services	3	2.672%
14	Contracting & Construction Engineering	7	3.618%
15	Paper & Packaging	3	3.775%
16	IT , Media & Communication Services	5	4.472%
	The total number of companies in the indices	179	

Source: Data Processing Output Using Excel 2016.

- **To explain the results of Table (3), we note the following: -**

The results showed that the Egyptian stock market sectors consist of 16 sectors with 179 companies, and that there is a herd behavior on the cases of buying and selling in the Egyptian stock market companies operating in the financial market sectors.

Sectors are five sectors of 76 companies, that have dispersion decrease (CSSD), and the sectors are (**Basic Resources**, **Banks**, **Travel & Leisure**, **Health Care** & **Pharmaceuticals**, **Food, Beverages and Tobacco**).

Test second Hypothesis: Test The multiple regression equation was applied to the independent variables (Stock Market Return, Exchange Rate, Sector Trading Volumes, Relative Corona virus Cumulative Cases, Relative Cumulative Corona virus deaths) on the five sectors in which herd behavior appeared, during the period from 1/3/2020 to 31/7/2020. The results are as follows:

Table (4): Summary of Multiple Regression Tables

Dependent Variable	Model Summary		ANOVA		Variables Independent	Coefficients of independent variables			
						Unstandardized	Standardized	t	Sig.
	R	R^2	F	Sig.		B	Beta		
Herding Behavior (HB)	.476[a]	0.2270	28.427	.000[b]	(Constant)	0.790		10.659	0.000
					SMR	-0.047	-0.124	-3.054	0.002
					ER	-0.650	-0.431	-10.525	0.000
					STV	-2.175E-05	-0.007	-0.181	0.856
					RCCC	-5.306	-0.228	-0.720	0.472
					RCCD	141.134	0.284	0.896	0.371

* Source: Data processing output using SPSS v.26.

To Explain the Results of Table No. (4), We Note the Following: -

The multiple regression results of the multiple regression model summary of herding behavior were as follows:

- The correlation coefficient (**R**) is (**.476**) and the coefficient of determination ($\mathbf{R^2}$) is (**0.227**).

- According to the (**F**) Test, the model was less than the significance level (0.05), which indicates the significance of the regression model.

- According to the (**T**) Test at a significance level of (0.05), the two independent variables "**Stock Market Return**" and "**Exchange Rate**" were the two variables that determined (**22.7%**) of the herding behavior in the five stock market sectors according to the initial hypothesis test.

A robustness test was performed for each of the five sectors in which the herding behavior was present and showing the following results:

Table (5): A summary of the multiple regression tables of the Egyptian stock market sectors with herding behavior

	Dependent Variable	Model Summary		ANOVA		Variables Independent	Coefficients of independent variables			
							Unstandardized	Standardized	t	Sig.
		R	R^2	F	Sig.		B	Beta		
1	**Basic Resources**	**.723[a]**	**0.523**	**20.129**	**000[b]**	**(Constant)**	**0.057**		**0.191**	**0.049**
						ER	-0.049	-0.031	-0.198	0.843
						SMR	-0.003	-0.009	-0.125	0.900
						STV	0.003	0.066	0.719	0.474
						RCCC	0.000	1.400	2.647	0.010
						RCCD	-0.005	-2.043	-3.297	0.001
2	**Banks**	**.818[a]**	**0.668**	**37.105**	**.000[b]**	**(Constant)**	**238.157**		**9.463**	**0.000**
						ER	0.204	0.134	1.028	0.307
						SMR	-0.118	-0.253	-4.038	0.000
						STV	-51.348	-3.027	-9.485	0.000
						RCCC	0.000	-2.235	-3.730	0.000
						RCCD	0.010	4.623	5.279	0.000
3	**Travel&Leisure**	**.700[a]**	**0.490**	**17.705**	**.000[b]**	**(Constant)**	**-234.026**		**-5.536**	**0.000**
						ER	0.812	0.623	3.765	0.000
						SMR	-0.132	-0.363	-4.539	0.000
						STV	349.557	2.248	5.520	0.000
						RCCC	0.000	5.084	6.666	0.000
						RCCD	-0.015	-7.969	-7.088	0.000
4	**Health Care& Pharmaceuticals**	**.647[a]**	**0.418**	**13.236**	**.000[b]**	**(Constant)**	**-0.865**		**-2.417**	**0.018**
						ER	0.726	0.415	2.420	0.018
						SMR	-0.001	-0.001	-0.018	0.986
						STV	0.003	0.082	0.946	0.346
						RCCC	0.000	2.445	4.186	0.000
						RCCD	-0.009	-3.261	-4.838	0.000
5	**Food, Beverages and Tobacco**	**.767[a]**	**0.589**	**26.339**	**.000[b]**	**(Constant)**	**0.140**		**0.726**	**0.047**
						ER	-0.058	-0.052	-0.361	0.719
						SMR	-0.070	-0.219	-3.178	0.002
						STV	-0.008	-0.293	-3.884	0.000
						RCCC	7.917E-05	1.190	2.390	0.019
						RCCD	-0.003	-1.584	-2.772	0.007

* Source: Data processing output using SPSS v.26.

To interpret the results of Table (5), we note the following:

1. The results of the multiple regression models for the sectors in which herd behavior appeared were as follows:

- **Basic resources**: Correlation coefficient (**R**) (.723) and determination coefficient ($\mathbf{R^2}$) (52.24%), and the variables determining herd behavior in the sector are variables (Corona virus Cumulative Cases, Cumulative Corona virus deaths).

- **Banks**: Correlation coefficient (**R**) (.818) and determination coefficient ($\mathbf{R^2}$) (66.85%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).

- **Travel & Leisure**: Correlation coefficient (**R**) (.700) and determination coefficient ($\mathbf{R^2}$) (49.04%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Exchange Rate, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).

- **Health & Care Pharmaceuticals:** Correlation coefficient (**R**) (.647) and determination coefficient ($\mathbf{R^2}$) (41.84%), and the variables determining herd behavior in the sector are variables (Exchange Rate, Corona virus Cumulative Cases, Cumulative Corona virus deaths).

- **Food, Beverages and Tobacco** Correlation coefficient (**R**) (.767) and determination coefficient ($\mathbf{R^2}$) (58.87%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).

2. The results of the statistical significance of the multiple regression models for all sectors were significant according to the (F) test at a significance level (0.05) where all the models were less than the significance level (0.05), which indicates significance of the regression models.

5. Results and concluded remarks

This paper attempts to research in two parts, the first part aims to study the Herding Behavior in the sectors of the Egyptian Stock Exchange, when the second part aims to study the factors that affect the Herding Behavior according to the identification of those factors. Factors based on the presentation of previous literature related to herd behavior, and these factors are represented in the exchange rate, Stock trading volumes as an indicator of Liquidity, stock market returns, and indicators of the spread of the Corona virus represented in the number of cumulative cases and deaths according to the population in Egypt. During the period from 1/3/2020 to 31/7/2020.

Sectors are five sectors of 76 companies, that have dispersion decrease (CSSD), and the sectors are (Basic Resources, Banks, Travel & Leisure, Health Care & Pharmaceuticals, Food, Beverages and Tobacco).

The results of the multiple regression models for the sectors in which herd behavior appeared were as follows:

- **Basic resources** determination coefficient (R^2) (52.24%), and the variables determining herd behavior in the sector are variables (Corona virus Cumulative Cases, Cumulative Corona virus deaths).**Banks** determination coefficient (R^2) (66.85%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).**Travel & Leisure** determination coefficient (R^2) (49.04%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Exchange Rate, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).**Health & Care Pharmaceuticals** determination coefficient (R^2) (41.84%), and the variables determining herd behavior in the sector are variables (Exchange Rate, Corona virus Cumulative Cases, Cumulative Corona virus deaths).**Food, Beverages and Tobacco** determination coefficient (R^2) (58.87%), and the variables determining herd behavior in the sector are variables (Stock Market Return, Sector Trading Volumes, Corona virus Cumulative Cases, Cumulative Corona virus deaths).

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