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COVID-19'UN SÜRÜ DAVRANIŞI ÜZERİNDEKİ ETKİSİ: GELİŞMEKTE OLAN AFRİKA ÜLKELERİ ÖRNEĞİ

THE EFFECT OF COVID-19 ON HERDING BEHAVIOR: EVIDENCE FROM AFRICAN EMERGING MARKETS*

Omer Faruk TAN [1]

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Abstract

The emergence of Coronavirus Disease (COVID-19) pandemic, which spread all over the world, created a shock effect on financial markets as in all areas. With fear and panic, investors couldn't make rational decisions and tried to imitate what other investors were doing. Unlike the idea of the efficient market hypothesis, investors showed herd behavior during the emergence of the pandemic. Hence, this paper investigates whether COVID-19 increased herding behavior in African emerging markets. We use a sample from the Johannesburg Stock Exchanges (JSE) and the Egyptian Exchange (EGX) for the period from January 4, 2010, to June 30, 2020. We find strong evidence of the presence of herding behavior in both stock markets during the COVID-19 period. Robust results are found in different sub-periods. The result of the study is important to help individual and institutional investors as well as financial regulators to find a solution to prevent herd behavior.

Keywords: COVID-19, Herding Behavior, South Africa, Egypt, Emerging Markets
JEL Classification: G40, G41, N27

Öz

Tüm dünyayı etkisi altına alan Koronavirüs Pandemisinin (COVID-19) ortaya çıkması ile finansal piyasalar üzerinde de şok etkisi yaratmıştır. Korku ve paniğe kapılan yatırımcılar rasyonel bir karar verememiştir ve diğer yatırımcıların almış oldukları kararları taklit etmeye çalışmışlardır. Etkin piyasalar hipotezinden farklı olarak yatırımcılar bu süreçte sürü davranışı göstermiştir. Bu nedenle, bu makale COVID-19'un gelişmekte olan Afrika pazarlarında sürü davranışını artırıp artırmadığını araştırmaktadır. Çalışmada Johannesburg ve Mısır Borsaları 04 Ocak 2010- 30 Haziran 2020 yılları arasında örneklem olarak kullanılmıştır. Analiz sonuçlarına göre COVID-19 döneminde güçlü bir sürü davranışı görüldüğü ortaya çıkmıştır. Farklı alt periyotlarda da bulduğumuz sonuç doğrulanmıştır. Çalışmanın sonucu, bireysel ve kurumsal yatırımcıların yanı sıra finansal piyasa düzenleyicilerin sürü davranışını önlemeye yönelik bir çözüm bulmasına yardımcı olması açısından önemlidir.

Anahtar Kelimleer: COVID-19, Sürü Davranışı, Güney Afrika, Mısır, Gelişmekte Olan Ülkeler

JEL Sınıflaması: G40, G41, N27

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[1] Asst. Prof. Dr., Marmara University Faculty of Business Administration, omer.tan@marmara.edu.tr, *Istanbul-Turkey*, ORCID: 0000-0002-8875-4696

1. Introduction

At the end of December 2019, the COVID-19 virus appeared in China and then it quickly spread throughout the world. Later, around the end of January, cases were declared in all countries. The World Health Organization (WHO) announced the pandemic on March 10, 2020, and advised all countries to take appropriate precautions (Tan, 2021). Such an unprecedented situation had a negative impact on social and economic life, as well as financial markets, causing widespread panic among investors. Stock markets, particularly in the United States (US), Japan, Germany, and the United Kingdom (UK), fell by 10-20% (Akhtaruzzaman et al., 2020; Ali et al., 2020; Ashraf, 2020b; Zhang et al., 2020). On March 16, the Chicago Board Options Exchange's Volatility Index, known as the VIX, reached the highest level in its history (Wagner, 2020). With such high uncertainty, investors were unable to decide what to do, and stock markets plummeted. As a result, in contrast to the efficient market hypothesis (EMH), investors didn't make perfectly rational decisions and were influenced by their emotions (Shleifer & Summers, 1990). The EMH is the cornerstone of classical financial theory. Its primary premise is that all investors are logical. Due to investors' propensity for acting irrationally, the theory is typically not true in the financial markets (Shiller, 1987; Summers 1986).

This situation brings to mind the following questions: Do investors show herding behavior during a pandemic period? Herding behavior is based on investors' psychological tendency to follow the actions of others. Investors imitate the actions and behaviors of other investors based on private information or public knowledge about others' behavior (Chang et al., 2020). Because of this herding tendency, groups of investors trade in the same direction, which obstructs the capability of financial markets to function efficiently. In periods of financial market turmoil, investors have a tendency to imitate the decisions of their counterparts because they are plagued by uncertainty (Kurz and Kurz-Kim, 2013). In this research, we analyze the existence of herding behavior in the financial markets of South Africa and Egypt during the COVID-19 period. Both African countries are included in the MSCI emerging markets index. There are few studies in the literature addressing the impact of COVID-19 on herding behavior, and studies conducted regarding COVID-19 in the existing literature generally include analyses of developed markets. We want to fill this gap in our study, which, to the best of our knowledge, is the first to analyze the impact of COVID-19 on herding behavior in African emerging markets.

2. Literature Review

In the literature, there are studies that analyze the impact of COVID-19 on herding behavior in financial markets, especially in Asian markets. Dhall and Singh (2020) examine herding behavior at the industry level in the Indian national stock exchange, including 12 industry indices, for the period from January 1, 2015, to June 1, 2020. In general, they do not find herding behavior in Indian stock markets. However, during the period after the COVID-19 outbreak (January 1, 2020 – June 1, 2020), the automobile industry presents herding behavior. During the bull market, the automobile, pharmacy, and information technology sectors indicate herding behavior while, in the bear market, only the media sector shows herding behavior. Bharti and Kumar (2022) also analyze herding behavior in the Indian market. They find that herding behavior exists during COVID-19 because of market volatility. They also add that with the help of control measures and government response, herding behavior is reduced. Lockdowns imposed to limit the spread of the virus, monetary policy measures and stimulus announced to revive the economy all give consistency and enhance investor confidence reducing worry and irrational herding. Jiang et al. (2022) investigate six Asian markets in Japan, South Korea, Chinese Mainland, Hong Kong, Singapore, and Taiwan and detect herding behavior during the pandemic era. They also do in-depth tests in groups of different levels of idiosyncratic volatility and find similar results. On the other hand, Wu et al. (2020) investigate herding behavior in two Chinese stock markets, the Shenzhen A-share and the Shanghai A-share. They demonstrate that herding behavior is significantly lower than usual in Chinese stock markets during the pandemic. They explore herding behavior under extreme market conditions, such as lower market volatility and trading volume, and upside market movement. Wen et al. (2022) study herding behavior in real estate, state-controlled and baking sectors in Hong Kong. They explore that there is herding behavior in the selected markets from August 2019 to January 2022. Mild herding is revealed in the period before COVID-19, which is most likely caused by the social chaos in Hong Kong in the second half of 2019. However, during COVID-19, no significant noticeable herding behavior is observed, mainly from February to July 2022. Chang et al. (2020) investigate herding behavior in energy stock markets during the global crises, SARS and COVID-19. They reveal that the presence of herding behavior is valid during the periods of extreme oil returns during COVID-19.

Fang et al. (2021) examine herding behavior in Eastern European countries (Russia, Poland, the Czech Republic, Hungary, Croatia and Slovenia). First, their findings indicate that the COVID-19 crisis strengthens the effect of global market returns on herding behavior in most Eastern European countries. Second, COVID-19 also reinforces the spillover effect of regional herding behavior in specific stock markets in almost all Eastern European countries. Espinosa-Méndez and Arias (2021a) examine the effect of COVID-19 on herding behavior in the stock markets of Germany, Italy, Spain, France, and the U.K. from January 2020 to June 2020. According to the results of the analysis, herding behavior is detected in all markets for stock returns, trading volume, and volatility in different

sub-periods. Espinosa-Méndez & Arias (2021b) investigate the effect of COVID-19 on herding behavior in the Australian stock market and find strong herding behavior in different sub-periods. Kizys et al. (2021) study the effects of government responses on herding behavior in 72 international stock markets during the COVID-19 period. They find herding behavior present in the first three months of 2020. They also reveal that stringent policies of government interventions diminish herding behavior. Bogdan et al. (2022) analyze the herding behavior for emerging, developed and frontier economies in Europe during COVID-19 and compare it with the pre-COVID era. Although, they find that herding behavior is not present in developed, emerging and frontier markets during pre-COVID-19, herding behavior exists in emerging and frontier markets during COVID-19.
Erdogan (2021) examines herding behavior in Borsa Istanbul by applying the state-space model utilizing cross-sectional volatility of beta coefficients and the results indicate the existence of beta herding in the COVID-19 era, while Yalçın and Aybars (2022) test herding behavior for the Turkish stock market and find no evidence of herding behavior, which can be interpreted that investors behave rationally under extreme fluctuations. This global shock is causing troubles for the global economy and stock markets. The alarming levels of the spread of the COVID-19 virus and the magnitude of the death toll cause intense economic anxiety and confusion across the globe, which is also reflected in the global economy and stock markets. With this in mind, we generate our hypothesis as follows:

Hypothesis: *Investors indicate herding behavior during the pandemic crisis.*

3. Data and Methodology

This part of the study explains the data and methodology.

3.1. Data

In this paper, we examine the presence of herding behavior in the financial markets of South Africa and Egypt during the pre and post-COVID-19 periods. The countries analyzed in this study are the only African countries included in the MSCI emerging markets index[2]. We collect data on the stock prices of the firms listed on the Johannesburg Stock Exchange (South Africa) and Egyptian Exchange (Egypt) for the period from January 4, 2010, to June 30, 2020. Since the level of herding behavior can be established with more validity using daily data, the daily returns of stock prices are used in the research (Tan et al., 2008; Espinosa-Méndez and Arias, 2021a). After excluding weekends and national holidays, our final data include 2,621 and 2,491 observations for the Johannesburg Stock Exchange (JSE) and Egyptian Exchange (EGX) respectively. We include only stocks active during the COVID-19 period, excluding the delisted or suspended ones. All data are obtained from Thomson Reuters DataStream.

3.1. Data

Based on the literature Chang et al. (2020); Chiang and Zheng (2010); Economou et al. (2016); Espinosa-Méndez and Arias (2021a); Guney et al. (2017); Mobarek et al. (2014) and Tan et al. (2008), we use the return dispersion method. Christie and Huang (1995) use the cross-sectional standard deviation of individual stock returns in relation to the market to measure herding behavior. E. C. Chang et al. (2000) modify the model and suggest the cross-sectional absolute deviation (CSAD) with non-linear regression.

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

Where $R_{i,t}$ is the daily return for stock i, $R_{m,t}$ is the market return (equal-weighted average return), and N is the number of stocks in the portfolio. The regression model based on a general quadratic relationship between $CSAD_t$ and $R_{m,t}$ is given below:

$$CSAD_{i,t} = \alpha + \beta_1 \left| R_{m,t} \right| + \beta_2 R^2_{m,t} + \varepsilon_t \qquad (2)$$

Where $CSAD_t$ is the measure of cross-sectional return dispersions on day t, $\left| R_{m,t} \right|$ is the absolute value of market return on day t, and $R^2_{m,t}$ is the square of market return on day t. Under the rational asset pricing models, β_1 should be positive and β_2 should be zero. On the other hand, if herding behavior is present, β_3 is expected to be negative and statistically significant. For the effect of COVID-19, we use the model of (Espinosa-Méndez & Arias, 2021a).

[2]For more detailed information: https://www.msci.com/market-classification

$$CSAD_{i,t}=\alpha+\beta_1 D^{covid}|R_{m,t}|+\beta_2(1-D^{covid})|R_{m,t}|+\beta_3 D^{covid}(R_{m,t})^2+\beta_4(1-D^{covid})(R_{m,t})^2+\varepsilon_t \quad (3)$$

Equation 3 demonstrates the presence of herding behavior before and after the emergence of COVID-19 cases. If herding behavior is present, β_3 and β_4 are expected to be negative and statistically significant. This study is divided into three sub-periods to assess the robustness of the results. Firstly, the period between January 4, 2020 and June 30, 2020 is considered the COVID-19 period. Secondly, both countries report their first cases on March 5, 2020, so the dummy variable equals one between March 5, 2020 and June 30, 2020. Thirdly, the dummy variable equals one from March 5, 2020 to April 17, 2020. While the uncertainty continues through mid-April, the stock markets begin to recover to a certain extent. Cepoi (2020) and studies in the literature consider April 17 as the last day (Ashraf, 2020a, 2020b, 2020c; Baig et al., 2020; Cepoi, 2020).

4. Empirical Findings and Discussions

Table 1 indicates the descriptive statistics for the Johannesburg Stock Exchange (JSE) and Egyptian Exchanges (EGX) respectively, which shows the return of each stock exchange and their CSAD results for the pre- and post-COVID-19 eras. When the two eras are compared, it is seen that the standard deviation of each stock is higher during the COVID-19 term. Especially the period between March 5 and April 17, 2020 shows the highest standard deviation. The result is normal because it is the early times of the pandemic, and there is so much panic in all countries and societies that it also affects stock markets. The minimum return of JSE is -0.03693 before the COVID, but the minimum return is -0.10226 during the post-COVID-19 era. The minimum return for EGX differs from JSE because they face the Arab Spring, which leads to a coup d'etat in November 2013. The political turmoil directly affects stock markets. Hence, the minimum return for EGX is similar in the pre- and post-COVID-19 eras. Figures 1- 4 indicate the graphical representations of stock returns and CSAD calculation.

Table 1: Descriptive Statistics

Panel A: Descriptive Statistics for Johannesburg Stock Exchange (JSE)										
Time Period	**04.01.2010-31.12.2019**					**02.01.2020-30.06.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
JSE	2497	0.0002	0.0009	-0.0369	0.0423	124	-0.0039	0.0248	-0.1022	0.0726
CSAD	2497	0.0183	0.0041	0.0089	0.0488	124	0.0370	0.0155	0.0171	0.0936
Time Period	**04.01.2010-04.03.2020**					**05.03.2020-30.06.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
JSE	2542	0.0002	0.0095	-0.0460	0.0423	79	-0.0033	0.0293	-0.1022	0.0726
CSAD	2542	0.0185	0.0042	0.0089	0.0488	79	0.0439	0.0150	0.0266	0.0939
Time Period	**04.01.2010-04.03.2020 / 18.04.2020-30.06.2020**					**05.03.2020-17.04.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
JSE	2591	0.0028	0.0097	-0.0460	0.0423	30	-0.0024	0.0434	-0.1022	0.0726
CSAD	2591	0.0188	0.0049	0.0089	0.0488	30	0.0561	0.0178	0.0266	0.0936
Panel B: Descriptive Statistics for Egyptian Exchange (EGX)										
Time Period	**04.01.2010-31.12.2019**					**02.01.2020-30.06.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
EGX	2371	0.0003	0.0135	-0.1022	0.0923	120	-0.0018	0.0210	-0.0904	0.0544
CSAD	2371	0.0176	0.0046	0.0080	0.0718	120	0.0242	0.0066	0.0139	0.0568
Time Period	**04.01.20-04.03.2020**					**05.03.2020-30.06.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
EGX	2415	0.0002	0.0136	-0.1022	0.0923	76	-0.0010	0.0242	-0.0904	0.0544
CSAD	2415	0.0176	0.0046	0.0080	0.0718	76	0.0268	0.0064	0.0175	0.0568
Time Period	**04.01.2010-04.03.2020 / 18.04.2020-30.06.2020**					**05.03.2020-17.04.2020**				
Variables	Obs.	Mean	Std. Dev	Min.	Max.	Obs.	Mean	Std. Dev	Min.	Max.
EGX	2461	0.0029	0.0136	-0.1022	0.0923	30	-0.0053	0.0341	-0.0904	0.0544
CSAD	2461	0.0178	0.0047	0.0080	0.0718	30	0.0297	0.0085	0.0175	0.0568

Source: All tables are created by the author

Figure 1: Daily stock returns of Johannesburg Stock Exchange

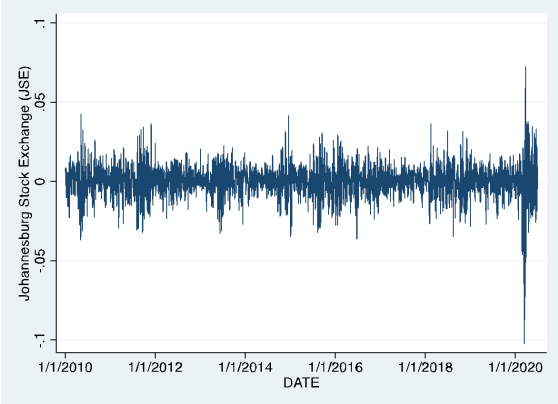


Figure 2: Daily CSAD for Johannesburg Stock Exchange

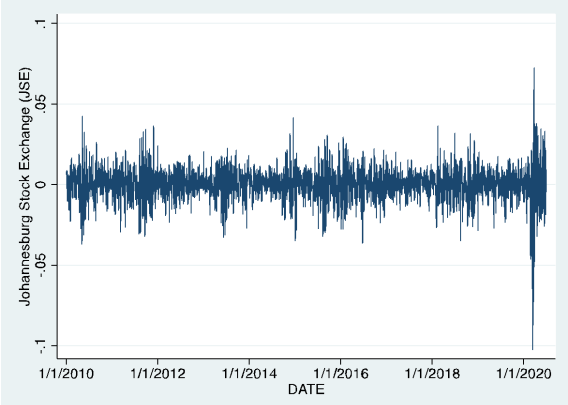


Figure 3: Daily stock returns of Egyptian Exchange

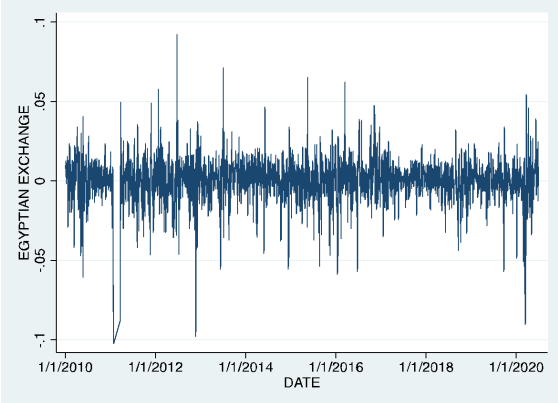
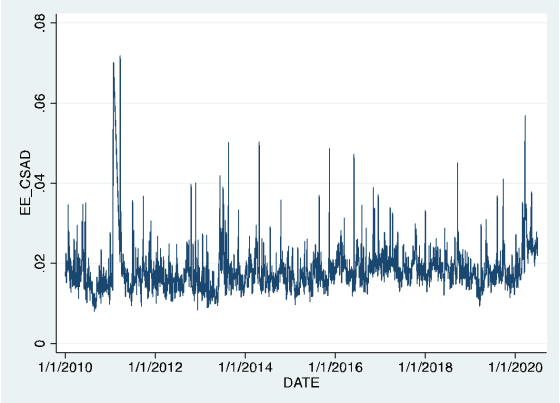


Figure 4: Daily CSAD for Egyptian Exchange



Source: All figures are created by the author

Tables 3 and 4 demonstrate the empirical results regarding the presence of herding behavior in the JSE and EGX, respectively. Based on the results, β_3 is negative and statistically significant for both markets that display herding behavior during the post-COVID-19 period in all three-sub periods. This phenomenon may occur because COVID-19 causes investors' fears of stock return uncertainty, and investors easily mimic the stock market trading behavior of others (Fang et al. 2021). We also analyze whether there is any asymmetry in herding behavior when the market is rising ($R_m>0$) and falling ($R_m<0$) (Espinosa-Méndez and Arias, 2021a). All panels indicate the asymmetric effects of market return for up and down markets. Our results are consistent with the literature (Espinosa-Méndez and Arias, 2021a, 2021b; Fang et al., 2021; Jiang et al., 2022). The difference between β_1 and β_2 is significant in all cases. Both markets show strong evidence of herding behavior in this crisis.

Table 3: Empirical Results for Johannesburg Stock Exchange (JSE)

	01.01.2020-30.06.2020			05.03.2020-30.06.2020			05.03.2020-17.04.2020		
Variables	All	$R_m>0$	$R_m<0$	All	$R_m>0$	$R_m<0$	All	$R_m>0$	$R_m<0$
β_1	1.313***	1.249***	1.185***	1.514***	1.348***	1.527***	1.782***	1.507***	1.859***
	(0.0381)	(0.0610)	(0.0565)	(0.0411)	(0.0673)	(0.0628)	(0.0590)	(0.101)	(0.0901)
β_2	0.0273	0.0670	-0.0315	0.0227	0.0829*	-0.0526	0.0744**	0.122**	0.0153
	(0.0365)	(0.0473)	(0.0559)	(0.0342)	(0.0480)	(0.0486)	(0.0363)	(0.0512)	(0.0513)
β_3	**-8.326*** **	**-4.063*** **	**-7.515*** **	**-10.63*** **	**-5.807*** **	**-11.22*** **	**-13.74*** **	**-7.568*** **	**-14.99*** **
	(0.590)	**(1.301)**	**(0.768)**	**(0.614)**	**(1.405)**	**(0.813)**	**(0.816)**	**(1.900)**	**(1.111)**
β_4	7.889***	7.699***	8.836***	8.316***	7.324***	9.971***	8.297***	8.635***	8.649***
	(1.398)	(1.801)	(2.156)	(1.257)	(1.828)	(1.742)	(1.319)	(1.890)	(1.838)
α	0.0176***	0.0174***	0.0179***	0.0177***	0.0174***	0.0180***	0.0176***	0.0173***	0.0179***
	(0.00017)	(0.00023)	(0.00026)	(0.00017)	(0.00024)	(0.00024)	(0.00018)	(0.00026)	(0.00026)
F-Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	2.621	1.380	1.241	2.621	1.380	1.241	2.621	1.380	1.241
R-squared	0.518	0.576	0.469	0.536	0.565	0.512	0.471	0.493	0.456
t-test									
H_0: $\beta_1=\beta_2$	35.04***	27.48***	22.40***	37.81***	29.261***	24.519***	42.485***	33.589***	27.014***
H_0: $\beta_3=\beta_4$	8.58***	8.28***	4.03***	8.59***	8.70***	4.82***	9.91***	10.40***	5.40***

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: All tables are created by the author

Table 4: Empirical Results for Egyptian Exchange (EGX)

	01.01.2020-30.06.2020			05.03.2020-30.06.2020			05.03.2020-17.04.2020		
Variables	All	$R_m>0$	$R_m<0$	All	$R_m>0$	$R_m<0$	All	$R_m>0$	$R_m<0$
β_1	0.655***	0.607***	0.726***	0.757***	0.713***	0.890***	0.911***	0.990***	0.956***
	(0.0443)	(0.0813)	(0.0642)	(0.0493)	(0.0902)	(0.0751)	(0.0659)	(0.127)	(0.0972)
β_2	0.0405**	0.0618**	0.0315	0.0403**	0.0614**	0.0334	0.0532***	0.0756***	0.0451*
	(0.0186)	(0.0267)	(0.0269)	(0.0186)	(0.0266)	(0.0267)	(0.0186)	(0.0265)	(0.0272)
β_3	**-6.893*** **	**-6.759*** **	**-7.748*** **	**-8.300*** **	**-9.073*** **	**-9.807*** **	**-10.15*** **	**-13.21*** **	**-10.59*** **
	(0.785)	**(2.223)**	**(1.009)**	**(0.838)**	**(2.389)**	**(1.113)**	**(1.025)**	**(3.008)**	**(1.372)**
β_4	2.097***	1.353**	2.415***	2.138***	1.351**	2.444***	1.948***	1.136**	2.270***
	(0.341)	(0.554)	(0.456)	(0.339)	(0.553)	(0.453)	(0.342)	(0.553)	(0.461)
α	0.0169***	0.0169***	0.0169***	0.0170***	0.0169***	0.0169***	0.0170***	0.0169***	0.0170***
	(0.00015)	(0.00020)	(0.00024)	(0.00015)	(0.00020)	(0.00023)	(0.00015)	(0.00020)	(0.00024)
Observations	2.491	1.353	1.138	2.491	1.353	1.138	2.491	1.353	1.138
R-squared	0.174	0.128	0.215	0.178	0.132	0.223	0.164	0.129	0.196
t-test									
H_0: $\beta_2=\beta_3$	37.50***	30.80***	23.20***	39.88***	32.09***	25.17***	43.01***	35.18***	26.79***
H_0: $\beta_3=\beta_4$	13.20***	11.61***	8.23***	13.85***	11.84***	8.87***	14.56***	12.70***	9.17***

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: All tables are created by the author

5. Conclusion

The efficient market hypothesis is the foundation of classical finance theory. The idea that all investors are rational is one of its basic assumptions. Yet, since investors frequently act irrationally in financial markets, the idea can't usually be held. With the emergence of COVID-19, investors show fear and panic, and they might imitate what other investors do. In this study, we try to detect herding behavior in two African emerging markets, Johannesburg Stock Exchange and Egyptian Exchange. To the best of the author's knowledge, this might be the first study to examine the effect of COVID-19 on African emerging markets. The findings, which demonstrate the presence of herding behavior in both markets, reveal that the unprecedented pandemic creates fear among investors and they try to follow other investors in stock markets during COVID eras. It is also found that there is an asymmetry between up and down markets. The findings of the study are especially important for individual and institutional investors seeking efficient risk diversification; furthermore, financial regulators should establish rules and avoid an increase in herd behavior. In future studies, other African countries can be added to the study to examine whether there is a difference between emerging and other countries in terms of herd behavior.

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