Mostafa Hussein Abd-Alla[*]
Ain Shams University

Sentimental herding: the role of COVID-19 crisis in the Egyptian stock market

Abstract: This study aims to investigate the existence of herding behaviour during COVID-19 crisis in the Egyptian stock market by using firm-level data and employing different testing methodologies. The study also investigates the existence of herding behaviour during COVID-19 crisis at the level of portfolios divided based on the size and the value factors. The study used the nonlinear model proposed by Chang, Cheng and Khorana (2000) and the state-space model developed by Hwang and Salmon (2004) to measure herding behaviour. The study found that the nonlinear model proposed by Chang et al. (2000) lead to results indicating evidence of herding during COVID-19 crisis. However, there was no evidence of herding behaviour during COVID-19 crisis when using the state-space model developed by Hwang and Salmon (2004). As for the level of portfolios, the study found evidence of herding during COVID-19 crisis only when using (Chang et al., 2000) methodology, at the level of the portfolio of stocks with low and high (B/M) ratio and the portfolio of big stocks only during COVID-19 crisis.

Date of submission: July 19, 2020; date of acceptance: October 4, 2020.

[*] Contact information: m_haa60@yahoo.com, Department of Business Administration, Ain Shams University, Cairo, Egypt, phone: 00201099195459; ORCID ID: https://orcid.org/0000-0002-0531-6325.

▰▰▰ INTRODUCTION

Behavioural finance is one of the most important topics in financial literature; this could be due to irrationalities in investment behaviour, which led to a lot of speculative bubbles. Behavioural finance and the Efficient Market Hypothesis has been a subject of controversy for decades, where one theory supporting market efficiency and the other attacks it. The EMH hypothesis supposes that investors always perform rationally and stock prices rapidly adjust to new information and reflect all available information. In contrast, behavioural finance studies the impact of psychology on the behaviour of investors in financial markets and supposes that the investors are irrational and make unreasonable decisions, which may lead to mistaken asset pricing. The science of behavioural finance was originated in the 1970s and 1980s as an application of behavioural economics to financial markets; it became an alternative to classical theory. The concept of cognitive psychology was used to explain the behaviour of investors in financial markets, which led to the birth of what is known today as behavioural finance. The goal of behavioural finance was to analyse financial phenomena in a more realistic way to explain the actual behaviour of investors in light of the uncertainty. Many empirical studies have shown that the functioning of markets often presents clear anomalies, in great contrast to traditional economic theories assumptions, which assume the absolute rationality of individuals. Investor's behaviour is the main factor to analyse the mechanism of the operation of the financial markets.

The most known forms of collective behaviour in capital markets is herding behaviour, which considered the main fields of behavioural finance. Hwang and Salmon (2004) confirmed that herding behaviour is the phenomenon when investors mimic others' decisions rather than following their own beliefs. This means that the returns on individual investments will move in the same direction as the market portfolio. Therefore the returns on individual investments tend to accumulate around the market returns. Devenow and Welch (1996) indicated that investors believe that imitation of others allows them to benefit from the information and experiences of others, or perhaps because of the low quality of their information, or the inability to analyse information efficiently. Many researches have been carried out to measure herding behaviour in financial markets, for example, Christie and Huang (1995) used the Cross-Sectional Standard Deviation of returns (CSSD) as a measure of the average closeness

of individual stock returns to the achieved market average returns to measure herd behaviour. Chang, Cheng and Khorana (2000) developed the work of Christie and Huang (1995); they use the Cross-Sectional Absolute Deviation of return CSAD in a non-linear regression to examine the relation between the level of stock return dispersions and the overall market return. Hwang and Salmon (2004) developed a different approach based on Logarithm Cross-Sectional Standard Deviation of Betas log [Std(β^{b}_{imt})] to test herding behaviour.

The Coronavirus or so-called COVID-19 discovered in Wuhan city in China in December 2019, it soon became a threat to public health, the world economy, and stock markets. The Egyptian Ministry of Health and Population announced on February 14th, 2020, the first confirmed infection of the new COVID-19 virus. The purpose of this study is to examine the impact of COVID-19 crisis on investors' herding behaviour in the Egyptian stock market. The study will be organized as follows. In section two we will provide a survey of the literature. The third section presents the data and methodology. The fourth section presents empirical results, and finally, we will provide the conclusions in section 5.

Literature review

Christie and Huang (1995) used the cross-sectional standard deviation (CSSD) of returns for daily data form 1962 to 1988 and monthly data form 1925 to 1988 for the US market to examine herding behaviour. They found the absence of herding behaviour. Therefore, the Christie and Huang (1995) method failed to detect herd behaviour.

Choe, Khoa and Stulz (1999) investigated the presence of herding behaviour in the Korean stock market during the 1997 Asian financial crisis. The study used a sample of 414 stocks for foreign investors' holdings. They found the absence of herding behaviour before the crisis, whereas there was little evidence of herding behaviour during the crisis.

Chang et al. (2000) developed the Christie and Huang (1995) method. They used a new approach based on the Cross-Sectional Absolute Deviation (CSAD) of returns in a nonlinear regression to investigate the presence of herding in five markets (Hong Kong, Taiwan, U.S US., Japan and South Korea). They found the absence of herding behaviour in developed markets (US, Hong Kong and Japan) and they observed the presence of herding behaviour in Taiwan and South Korea.

Hwang and Salmon (2004) developed a new method based on the Cross-Sectional Standard Deviation of the beta to test herding behaviour in the United States and South Korean markets. They used daily data from January 1, 1993, to November 30, 2003. The study also tested the herd behaviour during the Asian crisis in 1997. They observed the presence of herding behaviour in both the US and the South Korean markets in the normal market conditions rather than the market stress and also they observed the presence of herding behaviour in both tow markets shortly before the Asian financial crisis.

Ouarda, El Bouri and Bernard (2012) examined herding behaviour of a sample of 174 stocks included in the STOXX Europe 600 index from January 1998 to December 2010. They used the Chang et al. (2000) method to measure herding behaviour. They observed the presence of herding behaviour, especially during crises, where the herding behaviour appeared strongly during the financial crisis from 2007 to 2008.

Demir, Mahmud and Solakoglu (2014) investigated the presence of herding behaviour in the Istanbul Stock Exchange from January 2000 to October 2011. They used daily stock prices of the stock listed in the index BIST-100. The study followed Hwang and Salmon (2004) method to test herding behaviour. They observed the presence of herding behaviour in the Istanbul stock exchange; the study attributed this behaviour to the emotion and feelings of investors and not due to market conditions such as fluctuations in stock returns and market returns.

Elkhaldi and Benabdelfatteh (2014) investigated the presence of herding behaviour in the Tunisian stock market using daily data for a sample of 10 stocks from June 3, 2002, to May 31, 2013. They used Hwang and Salmon (2004) model to measure herding behaviour. They found evidence of the herding behaviour in the Tunisian stock market and they concluded that investors ignore their information and make their investment decisions according to general market tendency.

Javaira and Hassan (2015) investigated the presence of herding behaviour in the Pakistani stock market using daily and monthly closing prices of the KSE-100 index form 2002 to 2007. They used Christie and Huang (1995) and Chang et al. (2000) method to measure herding behaviour. They found the absence of herding behaviour in the Pakistani stock market because of the asymmetry in market returns.

Lee, Liao and Hsu (2015) examined the herding behaviour in the Taiwan stock market from January 4, 2000, to December 28, 2012. They used Christie

and Huang (1995) and Chang et al. (2000) method to measure herding behaviour. They concluded that herding behaviour increases in the case of extreme fluctuations in the market index, as large fluctuations in market return mean that investors feel panic and this may force them to choose to imitate others who have more information.

Özsu (2015) examined the herding behaviour in the Istanbul Stock market from January 14, 1988, to December 31, 2014. They used Christie and Huang (1995) and Hwang and Salmon (2004) method to measure herding behaviour. He concluded that herding behaviour under normal market conditions more than turbulent market conditions.

Angela-Maria, Pece and Pochea (2015) examined the impact of the global financial crisis on herding behaviour in 10 countries in CEE stock markets (Central and Eastern Europe). The study used daily data for 384 firms from January 2003 to December 2013 and used Chang et al. (2000) model to measure herding behaviour. They found evidence of the herding behaviour in 4 countries in CEE stock markets over the entire period. The study also found evidence of the herding behaviour under the global financial crisis in 5 countries in CEE stock markets.

Vieira and Pereira (2015) examined herding behaviour in the Portuguese stock market from January 2003 to December 2011 for a sample of 20 stocks. The study followed Chang et al. (2000) and Christie and Huang (1995) method to measure herding behaviour. They found the absence of herding behaviour in the Portuguese stock market, which suggests some evidence of the efficiency hypothesis of the Portuguese market.

Güvercin (2016) examined the impact of regional and global crisis like (the global financial crisis, the Egyptian political fluctuations on July 3, 2013, oil price fluctuations and the Syrian conflict) on the herding behaviour in the Egyptian and Saudi stock exchange. He found that herd behaviour only exists in the Egyptian stock market. The study also showed that the global financial crisis and the Egyptian political fluctuations on July 3, 2013, had a significant effect on herding behaviour. While oil revenues, the fluctuations in oil price and also the Syrian conflict haven't any effect on herding behaviour.

Kabir and Shakur (2017) examined herding behaviour in 8 countries from Asia (China, Hong Kong, India, Korea, Malaysia, Singapore, Taiwan and Thailand), and 4 from Latin America (Argentina, Brazil, Chile, and Mexico). The study used Daily returns from January 1995 to December 2014 and used Chang et al. (2000) model to measure herding behaviour. They found that the herd-

ing behaviour had a great statistical significance in China, followed by Hong Kong, Malaysia, Korea and India. The results also showed the reason that leads to herd behaviour is the high level of volatility. The study also concluded that investors in India and Thailand follow herding behaviour not only in the high level of volatility but also in the low level of volatility. They also found a significant level of herd behaviour in Hong Kong, Taiwan, Chile and Mexico in the low level of volatility.

Litimi (2017) examined herding behaviour for a sample consisting of 232 stocks listed on the French stock market, from January 1, 2000, to December 31, 2016. He divided the study period into 4 major crises period. The study followed Chang et al. (2000) method to measure herding behaviour. They found that herding behaviour had a great statistical significance in the French stock market during crises.

Mertzanis and Allam (2018) examined the herding behaviour in the pre- and post-revolution period of January 25, 2011, as the pre-revolution period begins on January 14, 2008, and ends on January 24, 2011, and the post-revolution period begins on March 23, 2011, and ends on April 15, 2014, for a sample of stocks listed in the EGX30 index in the Egyptian Stock market. They used Christie and Huang (1995) and Chang et al. (2000) method to measure herding behaviour. The study found a weak presence of herding behaviour in the two periods.

Youssef and Mokni (2018) examined herding behaviour in the Gulf Cooperation Council (GCC) group which is (Saudi Arabia, Qatar, Sultanate of Oman, Bahrain, Abu Dhabi, Kuwait) using weekly data from 2003-2017 and used Chang et al. (2000) model to measure herding behaviour. The results indicated that there is only herd behaviour in the markets of Qatar, Oman and Abu Dhabi and that there is no evidence of herd behaviour in the Bahraini and Kuwaiti markets. The results also indicated that herding behaviour is present in the Saudi market only during normal conditions, whereas, under the low volatile, it is easy for investors to monitor and imitate each other. In contrast, in Qatar, investors follow herding behaviour during periods of tension (high volatility) due to the uncertainty during this period.

Data and methodology

Data

The data contains daily returns of the EGX30 index, which is used as a proxy for the market portfolio and daily stock returns for 50 stocks listed in EGX 100 index to examine herding behaviour in the Egyptian stock market under the COVID-19 crisis from February 14th, 2020 to June 30, 2020, where the first infection of the COVID-19 virus in Egypt was confirmed on February 14th, 2020. The researcher also began collecting research data on June 30, 2020. The EGX 100 index measures the performance of the 100 most active companies in the Egyptian market, including the 30 most active companies that make up the EGX 30 and the 70 companies that make up the EGX 70. The data also include data for book values of equity which extracted from annual financial statements from June 2014 to June 2019.

Methodology

The study attempt to investigate the presence of herding behaviour for 50 stocks listed in the Egyptian stock market under the COVID-19 crisis. The sample is also divided into two groups based on the size (market capitalization) and value (book-to-market ratio) factor. The sample was divided into big and small portfolios according to the size factor and divided into portfolio consisting of stocks with high (book-to-market) ratio, a portfolio consisting of stocks with medium (book-to-market) ratio and portfolio consisting of stocks with low (book-to-market) ratio.

The big and small portfolios are constructed based on the firm size (market capitalization in June of each year t). The median sample size is used to construct the two portfolios according to 50% splitting point, where the big stocks portfolio consisting of the highest 50% stocks and the small stocks portfolio consisting of the lowest 50%. The sample is also ranked based on (book-to-market) ratio, where the sample is divided into 3 portfolios. The first portfolio is 30% of the whole sample, which has the highest (book-to-market) ratio. The second portfolio is 40% of the whole sample have (book-to-market) ratio in medium and the third portfolio is 30% of the whole sample, which has the lowest (book-to-market) ratio.

The study employs Hwang and Salmon (2004) and Chang et al. (2000) method to measure herding behaviour. Using daily stock price and EGX30 index data, Beta is estimated using the OLS method, as follows:

$$r_{itd} = \alpha_{it}^b + \beta_{imt}^b r_{mtd} + \varepsilon_{itd} \tag{1}$$

Where (r_{itd}) is the excess stock return and (r_{mtd}) is the excess returns of the market portfolio.

Returns of individual stocks are calculated as follows:

$$R_{it} = \frac{(P_t - P_{t-1})}{P_{t-1}} \tag{2}$$

Where (P_t) is the stock i closing price at time t.

The Hwang and Salmon (2004) methodology is used to measure herding behaviour. This methodology is based on the cross-sectional volatility of beta (ß), it also depends on the relationship between the equilibrium beta, which denoted by the symbol (β_{imt}) and its behaviourally biased equivalent, which denoted by the symbol (β_{imt}^b), as follows:

$$\frac{E_t^b(r_{it})}{E_t(r_{mt})} = \beta_{imt}^b = \beta_{imt} - h_{mt}(\beta_{imt} - 1) \tag{3}$$

Where $E_t^b(r_{it})$ is the behaviourally biased expected returns of asset i at time t and (β_{imt}^b) is the systematic risk measurement. $E_t(r_{mt})$ is the conditional expectation at time t of the market excess returns. (h_{mt}) is a time-variant latent herding behaviour parameter, (h_{mt}) = 0 indicates the absence of herding behaviour and (h_{mt}) = 1 indicates the presence of perfect herding behaviour that means that all the individual stock returns change following the market portfolio movements. To measure herding behaviour (h_{mt}) on a market-wide basis, the cross-sectional dispersion of (β_{imt}^b) is calculated, as:

$$Std_c(\beta_{imt}^b) = Std_c(\beta_{imt})(1 - h_{mt}) \tag{4}$$

When taking the logarithms on both sides, equation (4) is rewritten as follows:

$$\text{Log} \, [\, Std_c(\beta^b_{imt})] = \text{Log} \, [\, Std_c(\beta_{imt}) \,] + \text{Log} \, (1\text{-}h_{mt}) \tag{5}$$

Equation (5) may be rewritten as follows:

$$\text{Log} \, [\, Std_c(\beta^b_{imt})] = \mu_m + H_{mt} + \upsilon_{mt} \tag{6}$$

Where:

$$\text{Log} \, [\, Std_c(\beta_{imt}) \,] = \mu_m + \upsilon_{mt} \tag{7}$$

With $\mu_m = \text{E} \, [\text{Log} \, [\, Std_c(\beta_{imt}) \,] \,]$ and $\upsilon_{mt} \sim \text{iid} \, (0, \sigma^2_{m,\upsilon})$

and $H_{mt} = \text{Log} \, (1\text{-}h_{mt}) \tag{8}$

Hwang and Salmon (2004) allow herding (H_{mt}) to follow an AR (1) process and the model becomes:

$$\text{Log} \, [\, Std_c(\beta^b_{imt})] = \mu_m + H_{mt} + \upsilon_{mt} \tag{9}$$

$$H_{mt} = \varphi_m \, H_{m,t-1} + \eta_{mt} \tag{10}$$

Where $\eta_{mt} \sim \text{iid} \, (0, \sigma^2_{m,\eta})$.

The equations (9) and (10) contain herding as an unobserved component, which will be extracted using the Kalman filter like Hwang and Salmon (2004) methodology. The Log $[\, Std_c(\beta^b_{imt})]$ is expected to change with herding levels and this variation is reflected through (H_{mt}).

When the variance of the error term η_{mt} $(\sigma^2_{m,\eta})$ is statistically significant, this indicates the presence of herding behaviour among investors and a statis-

tically significant of the persistence parameter (φ_m) supports this observation. Authors require that (φ) must be stationary, i.e., $|\varphi| \leq 1$.

The cross-sectional standard deviation of betas is calculated monthly by the following equation:

$$Std_c(\beta)_t = \sqrt{\frac{\Sigma_{i-1}^{n}(beta_{it}-\overline{beta_t})}{n-1}} \tag{11}$$

The study also uses Chang et al. (2000) method based on the cross-sectional absolute deviation (CSAD) to measure herding behaviour, which is measured by:

$$CSAD = \frac{1}{N}\Sigma_{i=1}^{N}|R_{i,t} - R_{m,t}| \tag{12}$$

Where: $R_{i,t}$ and $R_{m,t}$ is the rate of return on stock i and market portfolio at time t, respectively. N is the number of stocks in the market portfolio. Chang et al. (2000) suggested a testing methodology based on the non-linear relationship between stock return dispersions and the market return, as follows:

$$CSAD_t = \alpha + \gamma_1|R_{m,t}| + \gamma_2\ R_{m,t}^2 + \varepsilon_t$$

According to Chang et al. (2000) methodology, during periods of extreme market price movements, the relations between individual stocks return desperation and market return is expected to be a non-linear relationship. The non-linear coefficient captured by γ_2. A negatively significant coefficient γ_2 indicates the existence of herding behaviour.

EMPIRICAL RESULTS

Table 1 shows the herding space-state model. The results show that the Coefficient c(3) which represents the persistence parameter (φm) and c(4) which represents the standard deviation (σmη) of the state-equation error (ηmt) are not statistically significant at the 5% level of significance, which confirms the absence of herding behaviour during COVID-19 crisis in the Egyptian stock market for all cases.

Table 1. Results of the state-space model

	Coefficient	Std. Error	Z-Statistic	Prob.
all sample stocks				
C(1)= μm	0.015467	0.083333	0.185607	0.8528
C(2)= vmt	-26.01392	1.38E+11	-1.88E-10	1.0000
C(3)= φm	0.209998	3.10935	0.067538	0.9462
C(4)= ηmt	-3.027382	14.80419	-0.204495	0.838
stocks with high book-to-market ratio				
C(1)= μm	0.033894	0.099929	0.33918	0.7345
C(2)= vmt	-22.79446	4.09E+10	-5.57E-10	1.0000
C(3)= φm	0.097342	6.270044	0.015525	0.9876
C(4)= ηmt	-2.510401	63.88309	-0.039297	0.9687
stocks with medium book-to-market ratio				
C(1)= μm	-0.033964	0.036863	-0.921346	0.3569
C(2)= vmt	-25.31355	1.24E+11	-2.04E-10	1.0000
C(3)= φm	-0.098035	4.538214	-0.021602	0.9828
C(4)= ηmt	-3.619681	47.17804	-0.076724	0.9388
stocks with low book-to-market ratio				
C(1)= μm	-0.01478	0.091988	-0.160672	0.8724
C(2)= vmt	-25.30821	1.47E+10	-1.72E-09	1.0000
C(3)= φm	0.364828	1.044999	0.349118	0.727
C(4)= ηmt	-2.911684	3.230393	-0.901341	0.3674
small stocks				
C(1)= μm	-0.008076	0.073362	-0.110082	0.9123
C(2)= vmt	-25.30716	1.50E+11	-1.68E-10	1.0000
C(3)= φm	-0.132373	3.060431	-0.043253	0.9655
C(4)= ηmt	-2.734563	24.00065	-0.113937	0.9093
big stocks				
C(1)= μm	0.04183	0.114405	0.365632	0.7146
C(2)= vmt	-6.043024	34.53124	-0.175002	0.8611
C(3)= φm	0.461076	1.075942	0.428533	0.6683
C(4)= ηmt	-3.305924	2.815955	-1.173997	0.2404

S o u r c e : author's construction.

Table 2 shows the results of herding behaviour in the Egyptian stock market using the cross-sectional absolute deviation (CSAD) model. Results show that the coefficient γ_2 is negative and statistically significant at 10% level of significance in the case of measuring the herding behaviour for all sample stocks. A negative and statistically significant coefficient γ_2 indicates the existence of herding behaviour during COVID-19 crisis in the Egyptian stock market.

For the portfolios divided by the value factor measured by (Book/Market) ratio, the results show that the coefficient γ_2 is negative and statistically significant at 10% level of significance for the portfolio of stocks with low (B/M) ratio and it is negative and statistically significant at 5% level of significance for the portfolio of stocks with high (B/M) ratio, which indicates the existence of herding behaviour during COVID-19 crisis in the portfolio of stocks with high (B/M) ratio and the portfolio of stocks with low (B/M) ratio at 5% and 10% level of significance respectively. However, for the portfolio of stocks with medium (B/M) ratio the coefficient γ_2 is not statistically significant, which confirms the absence of herding behaviour during COVID-19 crisis in the portfolio of stocks with medium (B/M) ratio.

For the portfolios divided by the size factor measured by the market capitalization, the results show that the coefficient γ_2 is negative and statistically significant at 5% level of significance for the portfolio of big stocks, which indicates the existence of herding behaviour during COVID-19 crisis in the portfolio of big stocks at 5% level of significance. However, for the portfolio of small stocks, the coefficient γ_2 is not statistically significant, which confirms the absence of herding behaviour during COVID-19 crisis in the portfolio of small stocks.

Table 2. Results of Regression of Daily CSAD

Coefficients	Constant			γ_1			γ_2		
	value	t-statistic	p-value	value	t-statistic	p-value	value	t-statistic	p-value
All sample stocks	0.0305	12.940	0.000	0.6804	3.42852	0.0009	-4.803	-1.826	0.071
Stocks with high (B/M) ratio	0.0098	10.58565	0.00	0.2138	2.72787	0.0077	-2.100	-2.02132	0.0463
Stocks with medium (B/M) ratio	0.0121	11.04683	0.000	0.250	2.69912	0.0084	-0.977	-0.79699	0.4276
Stocks with low (B/M) ratio	0.005	10.344	0.000	0.217	3.13173	0.0024	-1.726	-1.880	0.0635
Small stocks	0.0155	11.06935	0.000	0.2858	2.42096	0.0176	-1.918	-1.22544	0.2237
Big stocks	0.009	12.847	0.000	0.3945	4.020	0.000	-2.885	-2.21745	0.0292

S o u r c e : author's construction.

▪▪▪ Conclusion

Herding behaviour is considered the most important topics in financial litera-
ture, especially during the crisis. The emerging markets have been neglected
in previous studies on this topic. This is the first study that investigates herd-
ing behaviour during COVID-19 pandemic. The study tried to fill a gap in the
literature by providing evidence on herding behaviour in the Egyptian stock
market during COVID-19 crisis by using daily stock returns and daily returns of
the EGX30 index. The daily data covers the period from February 14th, 2020 to
June 30, 2020. The study also examined herding behaviour at the level of port-
folios divided based on the size and the value factors during COVID-19 crisis.
The results confirm that the Egyptian stock market is affected by a herding be-
haviour during COVID-19 crisis when using Chang et al. (2000) methodology.
This may be reflecting the investor's irrationality in the Egyptian stock mar-
ket. This irrationality may provide investors to decide based on following the
others rather than their own beliefs. This indicates that investors do not trust
their information during a crisis. Thus, these results contradicted with the as-
sumptions of the efficient market hypothesis.

   In contrast, the results demonstrated the absence of herding behaviour
when using Hwang and Salmon (2004) methodology. Also, the results demon-
strated that the portfolio of stocks with low and high (B/M) ratio and the port-
folio of big stocks only affected by a herding behaviour during COVID-19 cri-
sis, this is when using the Chang et al. (2000) methodology. However, Hwang
and Salmon (2004) methodology provide no evidence of herding behaviour at
the level of all portfolios.

   The results of this study have important practical implication, especially
for investors who concerned to know the degree of market efficiency and all
anomalies kinds that could affect their investment return, which helps them
to create suitable portfolios. This study comparing different empirical models
of herding behaviour during COVID-19 crisis. It would be interesting to retests
these models during COVID-19 crisis in other different emerging markets or de-
veloping and developed markets.

   It should be noted that the results of this study also interest market authori-
ties, where they should monitor all financial decisions taken by companies and
ensure that all companies' data are updated. They should also announce com-
panies that violate the publication of their data, or that make decisions that de-

ceive investors and enact deterrent laws for managers or anyone who can obtain private information and benefit from it without the rest of the investors.

■■■ REFERENCES

Chang, E.C., Cheng, J.W., & Khorana, A. (2000). An examination of herd behavior in equity markets: An international perspective. *Journal of Banking & Finance*, 24(10), 1651-1679. http://dx.doi.org/10.1016/s0378-4266(99)00096-5.

Choe, H., Khoa, B.-C., & Stulz, R.M. (1999). Do foreign investors destabilize stock markets? The Korean experience in 1997. *Journal of Financial Economics*, 54(2), 227-264. http://dx.doi.org/10.1016/s0304-405x(99)00037-9.

Christie, W.G., & Huang, R.D. (1995). Following the Pied Piper: Do Individual Returns Herd around the Market? *Financial Analysts Journal*, 51(4), 31-37. http://dx.doi.org/10.2469/faj.v51.n4.1918.

Demir, N., Mahmud, S.F., & Solakoglu, M.N. (2014). Sentiment and Beta Herding in the Borsa Istanbul (BIST). *Risk Management Post Financial Crisis: A Period of Monetary Easing Contemporary Studies in Economic and Financial Analysis*, 96, 389-400. http://dx.doi.org/10.1108/s1569-375920140000096016.

Devenow, A., & Welch, I. (1996). Rational herding in financial economics. *European Economic Review*, 40(3-5), 603-615. http://dx.doi.org/10.1016/0014-2921(95)00073-9.

Elkhaldi, A., & Benabdelfatteh, Y. (2014). Testing Herding Effects on Financial Assets Pricing: The Case of the Tunisian Stock Market. *British Journal of Economics, Management & Trade*, 4(7), 1046-1059. http://dx.doi.org/10.9734/bjemt/2014/8973.

Filip, A.M., Pece, M.A., & Pochea M.M. (2015). An Empirical Investigation of Herding Behavior in CEE Stock Markets under the Global Financial Crisis. *Procedia Economics and Finance*, 25, 354-361. http://dx.doi.org/10.1016/s2212-5671(15)00745-5.

Güvercin, A. (2016). Sentimental Herding: The Role of Regional and Global Shocks in Egyptian and Saudi Stock Markets. *Sosyoekonomi*, 24(27). http://dx.doi.org/10.17233/se.53541.

Hwang, S., & Salmon, M. (2004). Market stress and herding. *Journal of Empirical Finance*, 11(4), 585-616. http://dx.doi.org/10.1016/j.jempfin.2004.04.003.

Javaira, Z., & Hassan, A. (2015). An examination of herding behavior in Pakistani stock market. *International Journal of Emerging Markets*, 10(3), 474-490. http:/dx./doi.org/10.1108/ijoem-07-2011-0064.

Kabir, M.H., & Shakur, S. (2018). Regime-dependent herding behavior in Asian and Latin American stock markets. *Pacific-Basin Finance Journal*, 47, 60-78. http://dx.doi.org/10.1016/j.pacfin.2017.12.002.

Lee, Y.-H., Liao, T.-H., & Hsu, C.-M. (2015). The Impact of Macroeconomic Factors on the Herding Behaviour of Investors. *Asian Economic and Financial Review*, 5(2), 295-304. http://dx.doi.org/10.18488/journal.aefr/2015.5.2/102.2.295.304.

Litimi, H. (2017). Herd behavior in the French stock market. *Review of Accounting and Finance*, 16(4), 497-515. http://dx.doi.org/10.1108/raf-11-2016-0188.

Mertzanis, C., & Allam, N. (2018). Political Instability and Herding Behaviour: Evidence from Egypt's Stock Market. *Journal of Emerging Market Finance*, 17(1), 29-59. http://dx.doi.org/10.1177/0972652717748087.

Ouarda, M., El Bouri, A., & Bernard, O. (2012). Herding behavior under markets condition: Empirical evidence on the European financial markets. *International Journal of Economics and Financial Issues,* 3(1), 214-228.

Özsu, H.H. (2015). Empirical Analysis of Herd Behavior in Borsa Istanbul. *International Journal of Economic Sciences*, IV(4), 27-52. http://dx.doi.org/10.20472/es.2015.4.4.003.

Vieira, E.F.S., & Pereira, M.S.V. (2015). Herding behaviour and sentiment: Evidence in a small European market. *Revista De Contabilidad*, 18(1), 78-86. http://dx.doi.org/10.1016/j.rcsar.2014.06.003.

Youssef, M., & Mokni, K. (2018). On the effect of herding behavior on dependence structure between stock markets: Evidence from GCC countries. *Journal of Behavioral and Experimental Finance*, 20, 52-63. http://dx.doi.org/10.1016/j.jbef.2018.07.003.