

Herding behavior in stock market: An empirical study of energy sector of BRICS nations

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Abstract: This paper attempts to study the herding behaviour of Energy sector stocks toward the Market & equal-weighted average portfolio of the sector of BRICS. This study uses Closing price data from January 1st 2017 to December 31st 2022, of all fossil fuel companies from the energy sector of BRICS for those data was available. Those Companies were removed from a sample which was listed during the study period or delisted at any time during the study period. Nine companies selected from Brazil, 11 from Russia, one from India, 33 from China & 3 from South Africa are taken as a sample in this study. CSAD by Chang et al. (2000) & CSSD by Christie and Huang (1995) methodology for analysis of the herding behaviour is used in this study. The results show the herding behaviour during the study period in some countries of BRICS using the CSSD method & CSAD. Mostly found in China.

Keywords: Herding Behaviour, Energy Sector, CSAD, CSSD, BRICS & Stock Market.

1. Introduction

The average propensity of a group of managers to purchase or sell a certain stock simultaneously, as opposed to what could be anticipated if money managers traded separately, is known as herding behaviour in the stock market. Lakonishok and others (1992). People are extremely careful when it comes to money and finances. Whether investing money or putting it in a class of assets, they undertake all the necessary research and analysis. People act logically in this situation. If we give it some thought, this is only partially true because there are times in the stock market when investors fail to research because they believe that others with more money and resources have better information and ideas. As a result, they start to follow them and base their decisions on the opinions of others, ignoring their research and analysis in this area. It has caused people to make unreasonable decisions. Shih, H. T., and Guo, W. C. (2008). Herding occurs when one side of the crowd begins to move. They fail to consider the value of the stocks they own, selling them in the event of a crash and fail to even consider the future of the firm.

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According to the EMH (efficient market hypothesis) proposed by Fama in 1970, no one can outperform the Market since the market price of a share takes into account all the information included in the stock price. However, there are times when the Market behaves inefficiently, and one of those instances is herding behaviour, in which the investor does not act sensibly and efficiently but instead follows the herd. This allows traders to profit from the Market's inefficiencies and achieve above-average profits. (1986, Tversky & Kahneman). Some anomalies only occur once and then disappear from the stock market, while others persist over time. Herding behaviour is normally considered a short-duration phenomenon. Herding behaviour is typically thought of as a transient phenomenon. Happened quickly and then vanished. It persists throughout time in nations with high levels of inefficiency. The researcher discovered various empirical data from various stock markets regarding herding behaviour, including herding behaviour at the firm level Ouarda, Bouri & Bernard (2013) (Ferraruella & Mallor, 2021), herding behaviour at the fund manager level (Yan & Zhang, 2020) Liao, Huang, and Wu, (2011) Burch, Emery, and Fuerst (2016). Others have even claimed that the herding behaviour is short-term ineffective and does not exist in the Market in the long run. Various sorts of research have been done to comprehend the causes of herding behaviour. This study discovered that certain investor behaviours, including overconfidence, fear, and underestimating one's own analysis, might lead to herding behaviour at the level of retail investors. D. Kahneman and M. Riepe (2003). Because of the pressure to perform, Yan & Zhang (2020) discovered herding behaviour in the instance of the fund manager. Because of this, they consistently add the same stocks to their portfolio, which an experienced fund manager primarily chooses.

This article is composed of five parts: an introduction, a brief review of the literature; a discussion of the research gap, objectives, and formulation of hypotheses; a discussion of the research methodology used for data collection, sampling, study period, and analysis model; a discussion of the study's findings; and a discussion of the study's implications and conclusions.

2. Literature review

Herding behaviour is well-documented in the literature, although behavioural finance is a newer, recently created finance topic. Much research has also been conducted on a national and worldwide basis. Adem, Sarolu, and others (2020) measure the herding behaviour in the Istanbul stock market globally. In their 2012 study, Blasco, Corredor, and Ferreruella examined herding behaviour in the Spanish stock market. Chiang & Zheng (2010) assessed the herding behaviour under various market situations in 18 different nations. In the Portuguese, Italian, Greek, and Spanish markets, Economou et al. (2011) looked at the possible asymmetry of herding effects with regard to the sign of the market return, trading activity, and volatility (PIGS). In the developed markets of the US, UK, and Germany, herding behaviour was examined by Economou, Hassapis, and Philippas (2018) through ups and downs in the market conditions. Herding behaviour was examined in CEE (Czech Republic, Poland, Hungary, Romania, and Bulgaria) nations by Filip, Pochea, and Pece (2015). Australia (AU), Japan

(JP), Hong Kong (HK), Singapore (SG), and the United States (US) were the five developed stock markets that Chiang et al. (2013) used for their study. They also included China (CN), South Korea (KR), Thailand (TH), Indonesia (ID), Malaysia (MA), and Taiwan as five emerging stock markets (TW). In order to better understand herding behaviour, Kabir and Shakur (2018) performed research in the Asian and South American stock markets.

Lao & Singh (2011) studied the stock markets of the top two most populous nations based on total population to analyse the herding behaviour in various Asian stock markets, including India. In order to evaluate the herding behaviour during the whole, pre- and post-coronavirus illness 2019 in the Indian stock market, Dhall & Singh (2020) utilised the event research approach. In order to study the herding behaviour in the Indian stock market, Bharti & Kumar (2021) used the Nifty 50 index, representing the whole Market during COVID-19. They also took into account government measures to stop the Market's herding behaviour. Recently, researchers have been interested in examining the herding behaviour in several stock markets during the COVID-19 epidemic. Ferreruella and Mallor (2021) examined the stock market herding behaviour in Portugal and Spain. Five sub-periods are also included in the research period, which runs from January 2000 to May 2021. Akhtaruzzama, Boubaker (2021) and Sensoy in China and the G7 nations Hsiao (2014) examined the effects of Covid-19 on the outcomes of the Chinese stock market on the stock exchange. In order to study the herding behaviour in the Indian stock market, Bharti & Kumar (2021) used the Nifty 50 index, representing the whole Market during COVID-19. Singh and Dhall (2020).

The majority of the research mentioned above was carried out at the market level. However, Kabir (2018) also looked at herding behaviour at the market, Financial, and sub-financial sector levels. Using financial and non-financial data, Akhtaruzzama, Boubaker, and Sensoy (2021) will examine the effects of financial contagion. Retail investors were not the only ones who were studied when it came to herding; other research focused on the behaviour of fund managers. Al-Awadhi et al. (2020) used Baltagi's (2008) event research methodology to carry out the study of Cross-sectional dispersion of portfolio betas was utilised by Hudson, Yan, and Zhang (2020) to examine whether institutional-level investors in the UK stock market engage in herding behaviour. This study discovered herding among fund managers in regard to the market portfolio, size, and value variables. In research about the influence of investor mood on fund managers' herding behaviour, Liao, Huang, and Wu (2011) examined the US market using the trinomial-distribution methodology to quantify manager herding and the Lakonishok et al. (1992) method. According to the study, investor mood plays a substantial influence in funds manager herding, with the sell-side playing a larger role. In order to analyse the trading and volume patterns across different investor categories (retail and institutional) following the 9/11 attack in the US stock market, Burch, Emery, and Fuerst (2016) employed the microstructure trading metrics. According to the study, institutional investors who are trading on the other side might be affected by selling pressure from a retail investor with volume on the stock price. In other

instances, the choice made by the retail investor was not influenced by the pressure from institutional investors to sell, maybe as a result of the retail investor's stronger portfolio diversification. The study discovered mixed findings in their investigations throughout the course of the whole study period; they discovered herding in certain sub-periods. According to Ferreruela and Miller's (2021), there was greater herding behaviour in this Market before the financial crisis but not during it, and it reappeared following the crisis but was absent during the Covid-19. Boubaker, Sensoy, and Akhtaruzzama (2021) The study discovered that financial enterprises in these nations were more susceptible to financial contagion than non-financial firms, possibly as a result of the greater significance of this sector. In a negative market, Ouarda, Bouri, and Bernard (2013) found considerable evidence of herding behaviour, with the financial and technological sectors feeling the effects of herding the greatest. According to Adem and Sarolu (2020), investors act logically while the Market is up and herd when it is down and make illogical decisions. The findings of the Blasco, Corredor, and Ferreruela (2012) study demonstrated that herding behaviour exists in the Market and takes both logical and irrational factors into account when determining the strength of the behaviour. Herding was observed in developed stock markets (apart from the US) and Asian markets in both up and down market scenarios, according to a 2010 study by Chiang and Zheng. According to Vieira and Pereira's (2015) findings, investors are systematically imitating one another since herding intensity is negative and statistically significant. Research by Economou et al. (2011). discovered herding behaviour at the Greek and Italian stock markets. In 2015, Economou et al. discovered herding behaviour. In their 2018 study, Economou, Hassapis, and Philippas discovered cross-market herding behaviour in the chosen Market in addition to asymmetric herding behaviour under various sub-periods and market conditions. In their 2015 study, Filip, Pochea, and Pece discovered asymmetric herding behaviour in several sub-periods, market states, and cross-market herding as well. The global financial crisis had a bigger impact on herding for commercial and investment banks, according to Kabir's (2018) research, and this herding rises in a down market. According to Bharti and Kumar's study from 2021, the government's measures during the pandemic were successful in lowering herding behaviour in the Market. Singh and Dhall (2020) The results revealed three trends: anti-herding prior to the Covid 19 epidemic, herding during the Covid 19 outbreak, and herding behaviour only observed at the industry level during the post-Covid era.

The herding concept is not a new concept, so lots of studies were already conducted on this topic. This study is different from the earlier study as it is taking energy sector stocks. This study investigates energy sector stocks herd toward an equal-weighted average portfolio or overall Market during the study period. In the light of the research gap, the primary goal of this study is to investigate herding behaviour in the BRICS energy industry following hypothesis is formulated to achieve the objective of the study:

H₀₋₁: There is no significant presence of herding behaviour in the energy sector stocks toward the overall Stock market of BRICS.

H₀₋₂: There is no significant presence of herding behaviour in the energy sector stocks toward the Energy sector of BRICS.

3. Methodology

This section of the study explains the methodology used for analyzing the data to test the hypothesis.

3.1. Sources of Data & Study period

The study period for this study is from January 1st 2017 to December 31st 2022. This study uses the closing price of all the selected securities & Market indices. Data is collected from the wall street journal.

3.2. Sampling & Sample Profile

The author is using the listing companies in the energy sector (Fossil Fuel) of the BRICS as a sample. The Closing value for all the companies is collected from the database. Non-probability purposive sampling technique is used in this study. Companies that remain continue listing in the energy sector on the stock market during the study period are taken as samples from each stock market. Companies due for any reason delisted for some time during the study period or listed during the study period or for which data are not available are excluded from the sample. Table 1 shows the number of companies that are selected as samples from all stock markets:

Table 1: Number of companies taken as a sample from different countries.

Sr. No.	Name Of Country	Number Of Companies
		(Fossil Fuel)
1	Brazil	9
2	Russia	11
3	India	18
4	China	33
5	South Africa	3
Total		74

3.3. Analytical Technique

For the first hypothesis testing analysis, this study uses the main market index returns of the market to analyze grazing behavior. For testing the second hypothesis, this study uses equal-weighted

average portfolio returns of all selected companies from each exchange as sector returns to analyze the herding behaviour in that particular sector. For the analysis, the author uses descriptive statistics along with the methodology of cross-sectional standard deviation (CSSD) and cross-sectional absolute deviation (CSAD) provided by Christie and Huang (1995) and Chang et al. (2000). The Wall Street Journal closing value information is first converted to daily returns. The author converts the daily closing price into daily returns using log returns. The first method, CSSD (cross-sectional standard deviation), by Christie and Huang in 1995, is used to calculate the average proximity of individual stock returns to the aggregate market return. The cross-sectional standard deviation is regressed onto the dummy variables that are up and down, i.e., the right tail and the left tail. Next, the Linest Function is applied, and if the coefficient on the variables is negative and significant, we can detect herding behaviour going on. If the coefficient of variables is positive, we can say that the Market behaves rationally when the cross-sectional standard deviation increases with market volatility. The Christie and Huang cross-sectional standard deviation regression demonstrates that the Market appears to act rationally and devoid of herding signals. The left and right tails of the cross-sectional standard deviation rise, indicating that investors do not flock to the market signal or the views of major influencers. The CSSD formula is as follows.

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

N = the total number of Companies in the portfolio.

$R_{i,t}$ = Industry observed Stock return i at time t .

$R_{m,t}$ = cross-sectional average stock of N returns in the portfolio at time t .

$$CSSD = a + b1UP + b2DOWN + e$$

a = constant

$b1UP$ = upmarket condition

$b2DOWN$ = Market down condition

e = is the error term

The second technique was created by Chang et al. in 2000 and is called CSAD (cross-sectional absolute deviation). as it's been suggested that CSSD isn't the best way to spot herding. An absolute deviation cross-sectional regression was proposed by Chang et al. in 2000. The CSSD approach is redesigned by this idea on the grounds that return dispersion is anticipated to be a non-linear function of the market return. Measurement of return dispersion is accomplished by the cross-sectional absolute deviation (CSAD). The distinction between CSAD and CSSD is that the model's specification is non-linear, and all cross-sectional differences in returns indicators are absolute standard deviation variances. The

independent variables in this regression are market return, absolute market return, and squared market return. The cross-sectional absolute deviation is related to the squared market return by the value of 3 there. It examines the herding behaviour's non-linear dynamics. Herding is present if the co-efficient is both negative and substantial. The cross-sectional absolute deviation would be substantially less if the Market moved significantly up or down. The co-efficient would be highly positive if the Market is rational. There wouldn't be any herding behaviour.

Using the LINEST Function, market return, absolute market return, and squared market return are used as the explanatory factors. The dependent variables are cross-sectional absolute deviation. The CSAD formula is as follows:

$$CSAD_t = \frac{1}{N} \sum_{i=1}^N |R_{i,t} - R_{m,t}|$$

$R_{i,t}$ = stock return of asset i at time t .

$R_{m,t}$ = cross-sectional average of the N returns in the aggregate market portfolio at time t .

$$CSAD = a + b_1 rm + b_2 |rm| + b_3 r^2 m + e$$

a = constant

$b_1 rm$ = deviation of market return from CSAD

$b_2 |rm|$ = absolute deviation of market return from CSAD

$+b_3 r^2 m$ = square of deviation of market return from CSAD

e = is the error term

4. Analysis and Interpretation

4.1. Descriptive Statistics

An overview of the statistics for each variable for each nation is given in the table. The number of observations for each variable in each nation is displayed in the OBS column. The average value of the variable for each nation is displayed in the MEAN column. The standard deviation of the variable for each nation is displayed in the STD column. The MIN and MAX columns display the variable's minimum and maximum values for each nation. The skewness of the variable, which is a measure of the asymmetry of the distribution of the variable, is displayed for each nation in the SKW column. When the skewness is positive, the distribution is said to be skewed to the right, while when it is negative, it is skewed to the left. The kurtosis of the variable, which is a measurement of the "peakedness" of the distribution of the variable, is displayed in the KURT column for each nation. A distribution with a sharp peak is indicated by a high kurtosis value, whereas a distribution with a flatter peak is indicated by a low kurtosis value.

Table 2: Descriptive statistics of daily returns of *BRICS* for Market, CSSD & CSAD

Country		OBS	MEAN	STD	MIN	MAX	SKW	KURT
Brazil	CSAD	1242	0.0265	0.0250	0.0000	0.3240	5.4870	45.7660
	CSSD	1242	0.0385	0.0415	0.0000	0.5120	5.7470	47.7140
	Market	1242	0.0016	0.0270	-0.2110	0.2209	0.8360	14.8389
Russia	CSAD	1257	0.0125	0.0070	0.0010	0.0880	3.8770	23.1910
	CSSD	1257	0.0192	0.0148	0.0023	0.2120	4.4770	33.1310
	Market	1257	0.0005	0.0099	-0.0800	0.0531	-0.6353	10.7222
India	CSAD	1234	0.0183	0.0070	0.0055	0.1439	5.1260	63.7350
	CSSD	1234	0.0258	0.0128	0.0076	0.2510	7.3030	102.2000
	Market	1234	0.0001	0.0103	-0.0608	0.0809	-0.0809	5.5039
China	CSAD	1213	0.0056	0.0050	0.0052	0.0492	1.2050	2.3521
	CSSD	1213	0.0219	0.0087	0.0065	0.1330	2.6920	24.0270
	Market	1213	-0.0001	0.0148	-0.0999	0.0535	-0.8379	4.2864
South Africa	CSAD	1254	0.0290	0.0530	0.0000	0.8653	6.3260	66.7150
	CSSD	1254	0.0383	0.0704	0.0000	1.1270	6.2680	65.6140
	Market	1254	0.0025	0.0469	-0.3370	0.5591	2.8142	32.6572

Sources- Author's own Computation

Note: The table displays the mean, standard deviation, skewness, kurtosis, minimum and maximum values, as well as observations of the cross-sectional standard deviation and cross-sectional absolute deviation.

For instance, while looking at Brazil, the table reveals that the standard deviation is 0.0250, and the mean value for CSAD is 0.0265. The range of values is between 0.0000 and 0.3240. The distribution is strongly skewed to the right, according to the CSAD skewness of 5.4870. The distribution is very peaked, as seen by the kurtosis of the CSAD, which is 45.7660. Similar statistics apply to CSSD in Brazil, where the mean value is 0.0385, the standard deviation is 0.0415, and the lowest and highest values are 0.0000 and 0.5120, respectively. With a CSSD skewness of 5.7470, the distribution is clearly substantially skewed to the right. The CSSD's kurtosis, which measures how peaked the distribution is, is 47.7140. The Market in Brazil has a mean value of 0.0016, a standard deviation of 0.0270, a range of -0.2110 to 0.2209, and a range of 0.0270 to 0.0270. The Market's skewness, which measures how skewed to the right the distribution is, is 0.8360. The distribution of the Market is moderately peaked, as shown by the kurtosis of 14.8389. Similar data is provided for all of the other countries in the table, enabling comparison and study of consumer sentiment across other nations.

4.2. CSSD regression by Christie and Huang (1995)

Table 4 shows the herding behaviour in the energy sector's equal-weighted portfolio. It can be seen from Table 4 that in the Market down condition, there is no negative coefficient value is there, and also all the values are statically significant except India and South Africa. So, it means that there is no herding behaviour during down market conditions in the energy sector. But in the case of up Market condition, there is one negative value of the coefficient, but that is not statically significant, which means there is a hint of herding in that case, but not strong enough. So, in the case of the energy sector, china's stock market investors found a weak herd during the market conditions.

Table 3: CSSD: Herding behaviour in the BRICS energy sector

Countries		b2DOWN	b1UP	a
Brazil	coefficient	0.04124	0.18470	0.03348
	t-stats	4.25552	19.06007	15.08642
Russia	coefficient	0.01367	0.01689	0.01254
	t-stats	10.59915	13.10051	42.40307
India	coefficient	0.04473	0.07859	0.02637
	t-stats	11.06408	19.43987	28.43181
China	coefficient	0.00486	-0.00254	0.02431
	t-stats	2.80103	-1.83992	18.25800
South Africa	Coefficient	0.15227	3.25969	0.02275
	t-stats	0.44891	9.60988	0.29280

Sources- Author's own Computation

Table 4 in the BRICS. It can be seen from above that there is only one negative coefficient value in the down condition for South Africa, but that is not statically significant. But in the case of the Market up condition, there is a negative value of the coefficient in China, and that is also statically significant. So, investor herd during the market condition in China.

Table 4: CSSD: Herding Behaviour in BRICS Market

Countries		b2DOWN	b1UP	a
Brazil	coefficient	0.06710	0.02107	0.04435
	t-stats	5.88169	1.84663	16.97416
Russia	coefficient	0.01958	0.01837	0.01620
	t-stats	11.89992	11.16470	42.95614

India	coefficient	0.01153	0.02205	0.03475
	t-stats	2.37296	4.51124	30.97348
China	coefficient	0.00480	-0.00597	0.03425
	t-stats	1.66314	-3.07584	18.19558
South Africa	coefficient	-0.15629	0.79456	0.20862
	t-stats	-0.36567	1.87074	2.12982

Sources- Author's own Computation

4.3 Results of CSAD regression

From Table 5, it can see that there are only two negative values in $b_3r_m^2$, and that is for the South African and China markets. That simply means there is herding behaviour in the stock market. In the case of South Africa $b_3r_m^2$ Coefficient value is negative, but that is not statically significant, which means there is a weak sign of herding in the case of South Africa, and in the case of China, it has a significant negative value in $b_3r_m^2$. So here study found strong herding.

Table 5: CSAD: Herding behaviour in BRICS energy

Countries		$b_3r_m^2$	$b_2 rm $	b_1rm	a
Brazil	coefficient	0.65061	1.00320	0.25237	0.01304
	t-stats	19.19367	40.30543	13.81232	23.83200
Russia	coefficient	-0.09322	0.43706	0.07986	0.00649
	t-stats	-0.40411	16.78906	5.55318	25.47165
India	coefficient	16.39559	0.49738	0.11651	0.01485
	t-stats	15.03961	7.89950	4.36798	29.36530
China	coefficient	-0.95586	0.31450	0.00046	0.01274
	t-stats	-1.17138	7.68423	0.03308	35.87593
South Africa	coefficient	0.00176	1.25364	0.02190	0.00080
	t-stats	4.74245	110.50721	2.16229	1.38769

Sources- Author's own Computation

From Table 6, it can see that there are only two negative values in $b_3r_m^2$, and that is for the South African, Russian and China markets. That simply means there is herding behaviour in the stock market. In the case of South Africa $b_3r_m^2$ Coefficient value is negative, but that is not statically significant, which means there is a weak sign of herding in the case of South Africa and China. In the case of Russia, it has a significant negative value in $b_3r_m^2$. So here study found strong herding.

Table 6: CSAD: Herding Behaviour in BRICS Stock Market

Countries		$b_3r^2_m$	$b_2 rm $	b_1rm	a
Brazil	coefficient	3.77785	0.70054	-0.11481	0.02120
	t-stats	2.75517	5.46613	-2.15340	15.06036
Russia	coefficient	-1.29181	0.58614	-0.00286	0.00899
	t-stats	-9.44931	20.28926	-0.17690	26.40504
India	coefficient	4.28339	0.52845	0.13181	0.01954
	t-stats	3.53792	6.26507	3.48685	29.42111
China	coefficient	-0.09471	0.46024	0.00340	0.01856
	t-stats	-0.04235	5.17341	0.10554	32.27133
South Africa	coefficient	-56.57568	5.17894	2.84636	0.08339
	t-stats	-0.33323	0.57650	0.81076	1.15381

Sources- Author's own Computation

5. Conclusion

The previous study looked at the connection between the Market and herding behaviour. Nevertheless, the primary focus of this study is on analyzing the herding behaviour of the stocks in relation to the Market as a whole and the energy sector. This study focuses on the energy sector of the BRICS countries to ascertain whether there is any herding behaviour in the mentioned stock markets. Daily data collected from January 1st, 2017, to December 31st, 2022, the five-year statistics from each of the BRICS nations. Christie and Huang's (1995) cross-sectional standard deviation and Chang et al. (2000) cross-sectional absolute deviation are two methods utilized to analyze the data in this study. This study considers the herding behaviour in the energy sector of BRICS. Most of the previous studies considered the Market as a whole Ferreruela and Mallor (2021); Ouarda et al. (2013) and (Ferreruela & Mallor, 2021). Very less work has been done on the sector-related herding behaviour Akhtaruzzama, Boubaker, and Sensoy (2021) and Kabir (2018) in the financial sector. But this study contributes by considering the energy sector of BRICS.

References:

- [1] Adem, A. M. and Sarioğlu, S. E. (2020). Analysis of Investors Herding Behaviour: An Empirical Study from Istanbul Stock Exchange. *European Journal of Business and Management Research*, 5(2).
- [2] Akhtaruzzaman, M., Boubaker, S. and Sensoy, A. (2021). Financial contagion during COVID-19 crisis. *Finance Research Letters*, 38, 101604.

- [3] Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A. and Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and experimental finance*, 27, 100326.
- [4] Bharti & Kumar, A. (2021). Exploring Herding Behaviour in Indian Equity Market during COVID-19 Pandemic: Impact of Volatility and Government Response. *Millennial Asia*, 09763996211020687.
- [5] Blasco, N., Corredor, P. and Ferreruela, S. (2012). Market sentiment: a key factor of investors' imitative behaviour. *Accounting & Finance*, 52(3), 663-689.
- [6] Burch, T. R., Emery, D. R. and Fuerst, M. E. (2016). Who moves markets in a sudden marketwide crisis? Evidence from 9/11. *Journal of Financial and Quantitative Analysis*, 51(2), 463-487.
- [7] Chauhan, Y., Ahmad, N., Aggarwal, V. and Chandra, A. (2020). Herd behaviour and asset pricing in the Indian stock market. *IIMB Management Review*, 32(2), 143-152.
- [8] Chiang, T. C. and Zheng, D. (2010). An empirical analysis of herd behaviour in global stock markets. *Journal of Banking & Finance*, 34(8), 1911-1921.
- [9] Chiang, T. C., Li, J., Tan, L. and Nelling, E. (2013). Dynamic herding behaviour in Pacific-Basin markets: Evidence and implications. *Multinational Finance Journal*, 17(3/4), 165-200.
- [10] Dhall, R. and Singh, B. (2020). The COVID-19 pandemic and herding behaviour: Evidence from India's stock market. *Millennial Asia*, 11(3), 366-390.
- [11] Economou, F., Gavriilidis, K., Goyal, A. and Kallinterakis, V. (2015). Herding dynamics in exchange groups: Evidence from Euronext. *Journal of International Financial Markets, Institutions and Money*, 34, 228-244.
- [12] Economou, F., Hassapis, C. and Philippas, N. (2018). Investors' fear and herding in the stock market. *Applied Economics*, 50(34-35), 3654-3663.
- [13] Economou, F., Kostakis, A. and Philippas, N. (2011). Cross-country effects in herding behaviour: Evidence from four south European markets. *Journal of International Financial Markets, Institutions and Money*, 21(3), 443-460.
- [14] Fama, E. F. (1970). Session topic: stock market price behaviour. *The Journal of Finance*, 25(2), 383-417.
- [15] Ferreruela, S. and Mallor, T. (2021). Herding in the bad times: The 2008 and COVID-19 crises. *The North American Journal of Economics and Finance*, 58, 101531.
- [16] Filip, A., Pochea, M. and Pece, A. (2015). The herding behaviour of investors in the CEE stocks markets. *Procedia Economics and Finance*, 32, 307-315.
- [17] Guo, W. C. and Shih, H. T. (2008). The co-movement of stock prices, herd behaviour and high-tech mania. *Applied Financial Economics*, 18(16), 1343-1350.
- [18] Gupta, D. (2019). *Herding and Panic Behaviour in National Stock Exchange of India: An Empirical Study* (Doctoral dissertation).

- [19] Hudson, Y., Yan, M. and Zhang, D. (2020). Herd behaviour & investor sentiment: Evidence from UK mutual funds. *International Review of Financial Analysis*, 71, 101494.
- [20] Humayun Kabir, M. (2018). Did investors herd during the financial crisis? Evidence from the US financial industry. *International Review of Finance*, 18(1), 59-90.
- [21] Kabir, M. H. and Shakur, S. (2018). Regime-dependent herding behaviour in Asian and Latin American stock markets. *Pacific-Basin Finance Journal*, 47, 60-78.
- [22] Kahneman D. (2003). Maps of Bounded Rationality: Psychology for behavioural economics. *American Economic Review*, 93(5), 1449-1475.
- [23] Lao, P. and Singh, H. (2011). Herding behaviour in the Chinese and Indian stock markets. *Journal of Asian Economics*, 22(6), 495-506.
- [24] Liao, T. L., Huang, C. J. and Wu, C. Y. (2011). Do fund managers herd to counter investor sentiment? *Journal of Business Research*, 64(2), 207-212.
- [25] Mobarek, A., Mollah, S. and Keasey, K. (2014). A cross-country analysis of herd behaviour in Europe. *Journal of International Financial Markets, Institutions and Money*, 32, 107-127.
- [26] Ouarda, M., El Bouri, A. and Bernard, O. (2013). Herding behaviour under markets condition: Empirical evidence on the European financial markets. *International Journal of Economics and Financial Issues*, 3(1), 214.
- [27] Satish, B. and Padmasree, K. (2018). An empirical analysis of herding behaviour in the Indian stock market. *International Journal of Management Studies*, 3(3), 124.
- [28] Tversky, A. and Kahneman, D. (1986). The framing of decisions and the evaluation of prospects. In *Studies in Logic and the Foundations of Mathematics* (Vol. 114, pp. 503-520). Elsevier.
- [29] Vieira, E. F. S. and Pereira, M. S. V. (2015). Herding behaviour and sentiment: Evidence in a small European market. *Revista de Contabilidade*, 18(1), 78-86