Eduvest – Journal of Universal Studies

Volume 4 Number 10, October, 2024

p- ISSN 2775-3735- e-ISSN 2775-3727

WORLDWIDE RECESSIONS AND HERDING BEHAVIOUR: A COMPARATIVE ANALYSIS OF THREE COUNTRIES

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ABSTRACT

The general suggestion that behavioral science plays a part in creating abnormalities within the financial sector has been studied and proposed many times in the past. This study aims to prove the existence of behavioral sciences, specifically herding behavior, in three countries with different market conditions: Indonesia (Emerging), Vietnam (Frontier), and the United States (Developed). We developed our methodology using quantile regression to study the existence of herding behavior, and our findings were as follows: (1) As expected, the US didn't have any indication of a statistically significant herding presence; they do, however, indicate an insignificant presence of herding behavior in the post-covid period under bearish conditions (2) Vietnam does not indicate significant herding tendencies, (3) Surprisingly, Indonesia did not exhibit statistically significant herding presence, but both Indonesia and Vietnam exhibited the slight presence of herding behavior but still relatively insignificant.

KEYWORDS *COVID-19, Herding Behaviour, Emerging Markets, Frontier Markets, Developed Markets.*

INTRODUCTION

Behavioral science is crucial for understanding financial market abnormalities, especially during crisis periods such as pandemics. Concepts like prospect theory illuminate how individuals make decisions under risk and uncertainty, revealing that

How to cite: Suyadi, N.P et.al (2024). Worldwide Recessions and Herding Behaviour: A Comparative Analysis of Three Countries. Journal Eduvest. *4*(10): 8604-8613
E-ISSN: 2775-3727
Published by: https://greenpublisher.id/

investor behavior is often swayed by emotional factors and cognitive biases rather than pure rationality (Mihajlovic et al., 2022; Sánchez-Granero et al., 2020). During crises, such as the COVID-19 pandemic or the 2007 subprime mortgage crisis, past performance and education can shape perceptions and reactions, leading to heightened market volatility and herding behavior. This collective behavior, where investors mimic others' actions, often contradicts traditional economic theories like the rational expectation hypothesis (Muth, 1961) and the efficient market hypothesis (Fama, 1970), which assume that markets operate on the basis of rational decision-making and efficient information processing. Historical instances of herding, such as the 17th-century Tulipmania and the dot-com bubble, illustrate how emotional decision-making can lead to significant market distortions, resulting in overvalued assets and eventual crashes. Understanding these behavioral dynamics is essential for navigating and anticipating market reactions during tumultuous times (Choijil et al., 2022; Mishra & Mishra, 2023).

A notable example of herding behavior can be observed in emerging markets like Indonesia, particularly during times of economic uncertainty. For instance, the 2008 subprime mortgage crisis, while primarily rooted in the U.S. housing market, highlights how herding can emerge in different contexts (Chang et al., 2020). According to an article by the Federal Reserve, this crisis resulted from the expansion of mortgage credit to borrowers who would typically struggle to secure loans. While this specific crisis wasn't driven by stock market herding, it illustrates a different form: unqualified creditors engaging in herding behavior by extending credit, influenced by institutions lured by the potential of high interest rates on long-term loans backed by non-depreciating assets. This scenario underscores how economic conditions can amplify herding tendencies, especially in less stable markets (Chen & Zheng, 2022).

Before the pandemic, Indonesia's economy was thriving, with its GDP rising to 1.119 trillion USD in 2019. However, the pandemic caused a drop in GDP to 1.059 trillion USD, although inflation remained low (Swandari Budiarso & Pontoh, 2022). This economic stability increased public confidence in investing, aided by the emergence of accessible investment platforms. The pandemic also sparked a rise in novice investors influenced by social media "investment gurus." From 2020 to 2021, stock exchange investors increased by 92.99%, while gold remained the most popular investment choice. Herding behavior, prevalent in Indonesia's volatile market, has been documented in multiple studies, with investors following others' actions during downturns, as seen in the case of GOTO's fluctuating stock prices (Adnan, 2023).

According to the International Monetary Fund (IMF), herd behavior in financial markets has several potential causes: imperfect information, concern for reputation, and compensation structures. IMF also mentioned that there are two types of herd behavior: true (intentional) and spurious (unintentional). There are differences in effectivity between those two, where intentional herding tends to be inefficient and is usually characterized by fragility and idiosyncrasy. Influencers would usually try to influence unassuming, inexperienced traders to induce “herd buying” to try and increase the value of a fundamentally invaluable stock. The act of herd buying or

selling has historically started large, unfounded market rallies (Bennett et al., 2023; Kuramoto et al., 2024).

According to FTSE Russel's research, frontier markets are defined as markets that represent developing countries with high rates of economic growth but relatively illiquid stock markets. MSCI identified 29 different nations as frontier markets, one of which is Vietnam. An article by VN Express International mentioned that in 2022, Vietnam's retail stock investors reached 4.93 million and will only grow larger in the future. Vietnam's stock market started to boom in 2020 after the plunge due to COVID-19. An article by Nguyen et al. (2023) discovered that in the 4th wave of the COVID-19 pandemic, the Hanoi Stock Exchange (HNX) did not indicate any kind of herding behavior. However, they did find that in the Ho Chi Minh Stock Exchange, evidently there is an indication of pessimistic herd selling because of the falling stock prices.

Investing is an ever-growing trend in Vietnam; Vietnam has two stock exchanges: the Hanoi Stock Exchange (HNX) AND the Ho Chi Minh Stock Exchange (HOSE). At the end of 2020, the number of investor accounts was just over 4.5 million accounts. This was an astonishing number, considering the population of Vietnam is just over 98 million. In April 2023, the number increased marginally to over 7 million, approximately 7% of the total population. The market capitalization has also increased marginally from 5,416 trillion VND at the end of April 2023 to 6 quadrillion VND at the end of 2023, which is equivalent to about 62% of the total GDP. The increase in investors over the years and the increase in market capitalization indicate that Vietnam has what it takes to be considered a frontier market.

Vietnam's investors consist mostly of individual household investors, with few institutional investors as a minority. Based on the research provided by CFA Community Vietnam (2020), the securities assets held by domestic investors, primarily individual investors, make up some portions of the overall stock market, which indicates that retail investors rather than institutional investors largely drive the market. This leads to unstable transactions, and since many of the individual investors are still unaware of legal conditions and have very limited understanding and knowledge, they often act according to hearsay. Also, since the stock market in Vietnam is still in its early stages of development, the psychological aspects are still a contributing element to stock movements. False rumors and inflationary pressure affect investors' decision-making in these markets tenfold compared to developed markets. Buying and selling shares according to rumors and misinformation is what ultimately leads to the formation of herd instinct, as with low individual knowledge and confidence comes imitation (Mubarok & Fadhli, 2020).

With over 158 million investors and a market capitalization of $51.47 trillion, the U.S. stock market remains highly productive, even after participation fell following the 2008 recession. Despite being a developed economy, herding behavior still occurs, particularly during volatile periods like the financial crisis. This is driven by macroeconomic data and uncertainty, as observed in both institutional and individual investors. In contrast, Indonesia (emerging) and Vietnam (frontier) show similar

tendencies, with Indonesia's strong GDP and Vietnam's rapid growth making them appealing to investors.

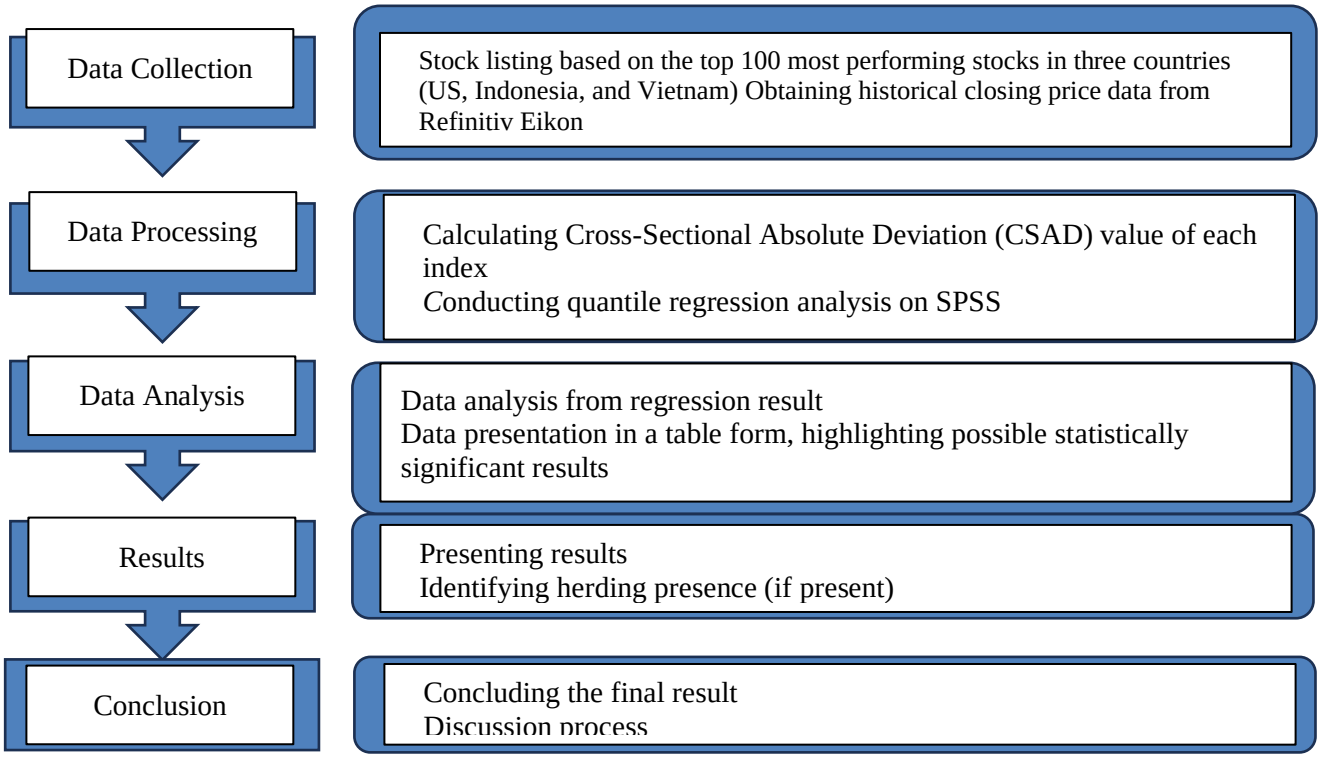
This study compares herding behavior in Indonesia, Vietnam, and the U.S. during the COVID-19 pandemic, examining whether market efficiency minimizes herding in developed markets, as proposed by Eugene Fama's efficient market hypothesis (EMH). Data will focus on each country's top 100 performing stocks, selected for their high liquidity and large market capitalization. These factors are associated with stability, making the stocks attractive for investors while allowing us to observe herding tendencies across different market classifications.

RESEARCH METHOD

Research Design

This research employs a quantitative exploratory design to compare herding behavior across frontier, emerging, and developed markets. It aims to challenge traditional models like CAPM and EMH. Variables and methodology are based on Nguyen et al. (2023), focusing on the period from 2019-2023, with special attention to the impact of COVID-19. Data will be sourced from the top 100 stocks from Kompas-100 (Indonesia), VN-100 (Vietnam), and Nasdaq-100 (US), focusing on highly liquid stocks with large market capitalizations. The analysis covers the full period (2019-2023) and the pandemic period, split into DUR-COV (March 2020 - May 2021) and POST-COV (May 2021 - July 2022).

Methodological Framework



Data Analysis Method

The study by Nguyen et al. (2023) uses two main steps: a stationarity test, descriptive statistics, and quantile regression, with descriptive statistics as a preliminary step. Descriptive statistics summarize the relationship between variables across three time periods: pre-COVID, post-COVID, and the full COVID period, each divided into bearish and bullish markets with varying trading volumes. Quantile regression, a robust alternative to OLS, is used to address distributional tails, offering a more comprehensive analysis of the impact of variables on CSAD. It is particularly effective in analyzing herding behavior under different market conditions, with results indicating herding if certain parameters are significantly negative.

RESULT AND DISCUSSION

The Effects of the COVID-19 Pandemic Towards Herd Presence in Different Market Conditions

During COVID-19 Under Bullish Conditions

The results for the DUR-COV period under bullish conditions are similar to those from the period in default conditions. The coefficients are highly positive and, therefore, do not exhibit the existence of herding behavior within this period during bullish market conditions. These results align with our assumption that herding will not be present in positive and stable markets. However, this contradicts the research by Vidya et al. (2023), which found that in some Asian countries, such as Indonesia and Vietnam, herding behavior is present in bullish market conditions.

Table 1. Regression Output of Kompas100, VN-100, and NASDAQ100 Index during the Covid-19 Pandemic Under Bullish Condition

Index	Quantile	Absolute MR		(t-stat)	Squared MR		(t-stat)	Pseudo R
		Coeff	Std. Error		Coeff	Std. Error		
Kompas100	**Q10**	0.111	0.0530	(2.096)	6.6766	0.6902	(9.802)	0.244
	Q25	0.206	0.0653	(3.152)	5.744	0.8492	(6.764)	0.261
	Q50	0.250	0.0758	(3.302)	5.127	0.9864	(5.198)	0.308
	Q75	0.567	0.0945	(6.002)	1.838	1.2303	(1.494)	0.397
	Q90	0.526	0.1786	(2.946)	1.918	2.3242	(0.825)	0.507
VN-100	**Q10**	0.075	0.0907	(0.825)	11.746	2.4586	(4.778)	0.183
	Q25	0.056	0.0965	(0.577)	11.409	2.6148	(4.363)	0.175
	Q50	-0.267	0.1761	(-1.519)	22.707	4.7717	(4.759)	0.168
	Q75	-0.047	0.4496	(-0.104)	14.954	12.1828	(1.227)	0.154
	Q90	-1.117	0.6566	(-1.702)	66.986	17.7917	(3.765)	0.151

DUR-COV	**Q10**	0.006	0.0593	(0.108)	4.111	0.9210	(4.464)	0.127
	Q25	0.020	0.0604	(0.339)	3.645	0.9389	(3.882)	0.130
	Q50	0.027	0.0702	(0.389)	4.736	1.0907	(4.343)	0.185
	Q75	0.66	0.0846	(0.783)	5.711	1.3143	(4.345)	0.266
	Q90	0.181	0.2127	(0.853)	3.521	3.3038	(1.066)	0.362

During COVID-19 Under Bearish Conditions

The negative coefficients in the DUR-COV periods started appearing under bearish conditions with negative market returns. The negative coefficients could especially be seen in Vietnam's VN-100 index at lower quantiles (10%; 25%) and the US Nasdaq100 index at higher quantiles (75%; 90%). Indonesia's Kompas100 index, however, stayed relatively stable with no exhibits of negative coefficients across all quantiles under bearish conditions. The negative numbers in VN-100, considering it is located at lower quantiles, mean that the dispersions between its CSAD and MR are greater with lower CSAD values than its middle to higher CSAD values. It's a different case with the US' Nasdaq100 index as this index indicates negative coefficients at higher quantiles, this means that the dispersions are much more pronounced than those in lower quantiles.

Table 2. Regression Output of Kompas100, VN-100, and NASDAQ100 Index during the Covid-19 Pandemic Under Bearish Condition

Index	**Quantile**	**Absolute MR**		**(t-stat)**	**Squared MR**		**(t-stat)**	**Pseudo R**
		Coeff	Std. Error		Coeff	Std. Error		
Kompas100	**Q10**	0.126	0.1036	(1.213)	10.162	2.2742	(4.468)	0.266
	Q25	0.093	0.0917	(1.015)	10.162	2.0131	(5.075)	0.260
	Q50	0.374	0.1579	(2.367)	5.416	3.4666	(1.562)	0.280
	Q75	0.137	0.2474	(0.554)	13.671	5.4325	(2.517)	0.294
	Q90	0.214	0.4401	(0.487)	14.529	9.6645	(1.503)	0.378
VN-100	**Q10**	0.532	0.1426	(3.733)	-0.375	2.7608	(-0.136)	0.258
	Q25	0.727	0.1617	(4.496)	-3.398	3.1308	(-1.085)	0.329
	Q50	0.281	0.1690	(1.664)	8.670	3.2715	(2.650)	0.404
	Q75	0.230	0.2532	(0.909)	12.026	4.9018	(2.453)	0.473
	Q90	0.224	0.5177	(0.433)	10.866	10.0242	(1.084)	0.520
DUR-COV	**Q10**	-0.050	0.0619	(-0.813)	1.745	0.6562	(2.660)	0.140
	Q25	-0.080	0.0487	(-1.646)	1.435	0.5162	(2.779)	0.147
	Q50	-0.191	0.0626	(-3.055)	0.448	0.6636	(0.675)	0.181
	Q75	-0.250	0.1265	(-1.977)	-0.230	1.3415	(-0.172)	0.188
	Q90	-0.478	0.3120	(-1.532)	-2.298	3.3078	(-0.695)	0.168

Late COVID-19 Under Bullish Conditions

Higher negative γ_2 coefficients start to appear in these results, specifically the regression results of the LATE-COV period under Bullish conditions. It is especially apparent in Indonesia's Kompas100 and Vietnam's VN-100 indexes. Indonesia's Kompas100 index indicated negative γ_2 coefficients at most quantiles (10%, 50%, 75, 90%), while Vietnam's VN-100 index exhibited negative γ_2 coefficients across all quantiles (10%, 25%, 50%, 75%; 90%). In contrast, The US Nasdaq100 index indicated different results with highly positive γ_2 coefficients across the board.

The results indicate that positive market returns within recovery periods actually manifest a lot more dispersion between CSAD and MR in developing and frontier markets. The higher $\gamma 2$ coefficients observed in Indonesia's Kompas100 and Vietnam's VN-100 indices may imply that the investors investing in these indices are more prone to herding tendencies under bullish conditions in recovery periods. Conversely, the US Nasdaq100 index exhibits no herding tendencies at all, maintaining a high degree of market efficiency during recovery periods. This could be attributed to the more liquid nature of the US Nasdaq100 index, allowing less information asymmetry and independent decision-making among investors.

Table 3. Regression Output of Kompas100, VN-100, and NASDAQ100 Index during late Covid-19 Pandemic Under Bullish Condition

Index	Quantile	Absolute MR		(t-stat)	Squared MR		(t-stat)	Pseudo R
		Coeff	Std. Error		Coeff	Std. Error		
Kompas100	**Q10**	0.381	0.2558	(1.489)	-13.480	13.3937	(-1.006)	0.015
	Q25	0.047	0.2900	(0.162)	9.333	15.1822	(0.615)	0.013
	Q50	0.501	0.3721	(1.346)	-14.710	19.4803	(-0.755)	0.025
	Q75	0.551	0.6014	(0.917)	-20.069	31.4858	(-0.637)	0.018
	Q90	1.356	1.0170	(1.333)	-58.808	53.2457	(-1.104)	0.042
VN-100	**Q10**	0.389	0.1298	(2.997)	-1.204	3.4339	(-0.351)	0.062
	Q25	0.260	0.1628	(1.595)	-0.052	4.3048	(-0.012)	0.054
	Q50	1.070	0.4008	(2.670)	-15.845	10.6011	(-1.495)	0.063
VN-100	**Q75**	0.880	0.7767	(1.133)	-16.549	20.5429	(-0.806)	0.031
	Q90	1.572	1.2822	(1.226)	-25.452	33.9120	(-0.751)	0.026
NASDAQ100	**Q10**	0.45	0.0988	(0.456)	7.256	2.9379	(2.470)	0.194
	Q25	-0.31	0.1015	(-0.304)	9.845	3.0179	(3.262)	0.203
	Q50	-0.37	0.1253	(-0.297)	10.661	3.7262	(2.861)	0.222
	Q75	-0.237	0.1414	(-1.674)	16.782	4.2051	(3.991)	0.277
	Q90	-0.303	0.2649	(-1.146)	18.441	7.8783	(2.337)	0.347

Late COVID-19 Under Bearish Conditions

The LATE-COV period under bearish conditions yielded opposite results where Indonesia's Kompas100 and Vietnam's VN-100 indices do not exhibit any negative coefficients across all quantiles while the US' Nasdaq100 exhibited negative coefficients at all of its quantiles (10%; 25%; 50%; 75%; 90%). The results suggest a significant difference in the reaction of investors within developing, frontier, and developed markets. Considering the negative market return condition, it is speculated that the negative numbers in the US Nasdaq100 are caused by higher market anxiety and risk aversion among investors.

Table Error! No text of specified style in document.**. Regression Output of Kompas100, VN-100, and NASDAQ100 Index during late Covid-19 Pandemic Under Bullish Condition**

Index	**Quantile**	**Absolute MR**		**(t-stat)**	**Squared MR**		**(t-stat)**	**Pseudo R**
		Coeff	Std. Error		Coeff	Std. Error		
Kompas100	**Q10**	-0.023	0.1865	(-0.122)	14.049	5.7700	(2.435)	0.064
	Q25	0.359	0.1650	(2.175)	5.272	5.1040	(1.033)	0.125
Kompas100	**Q50**	0.355	0.2206	(-1.608)	3.752	6.8242	(0.550)	0.112
	Q75	0.311	0.3491	(0.890)	5.056	10.8018	(0.468)	0.126
	Q90	0.152	0.5024	(0.302)	3.778	15.5447	(0.243)	0.106
VN-100	**Q10**	-0.324	0.1187	(-2.727)	23.042	2.6287	(8.765)	0.156
	Q25	-0.269	0.2457	(-1.093)	20.231	5.4440	(3.716)	0.159
	Q50	-0.601	0.3761	(-1.599)	28.986	8.3325	(3.479)	0.150
	Q75	-0.89	0.4092	(-0.217)	24.241	9.0647	(2.674)	0.235
	Q90	0.432	0.5361	(0.806)	13.058	11.8761	(1.100)	0.393
NASDAQ100	**Q10**	-0.219	0.0885	(-2.468)	-0.499	2.2325	(-0.224)	0.209
	Q25	-0.355	0.919	(-3.856)	-2.920	2.3184	(-1.259)	0.276
	Q50	-0.326	0.0895	(-3.648)	-1.539	2.2558	(-0.682)	0.282
	Q75	-0.460	0.1367	(-3.365)	-2.077	3.4477	(-0.602)	0.316
	Q90	-0.399	0.2377	(-1.680)	-0.648	5.9929	(-0.108)	0.286

Overall, in the case of Indonesia's Kompas100, Vietnam's VN-100, and the US Nasdaq100, the existence of herding behavior within said indices is still unproven. However, we can see hints of negative (t-stat) coefficients in different periods and market conditions. The LATE-COV period is the most notable period, which indicated negative γ_2 coefficients in bullish and bearish conditions. Granted, within bullish conditions, the indices indicating negative γ_2 coefficients are Indonesia's Kompas100

and Vietnam's VN-100, while the US' Nasdaq100 only indicated negative γ_2 coefficients in bearish conditions.

The presence of negative γ_2 coefficients in specific conditions and periods aligns with the notion that herding tendencies might appear to be more pronounced in certain market phases, particularly when investors are faced with optimism and/or uncertainty. However, considering the lack of statistical significance within the regression results, the findings are closer to Eugene Fama's Efficient Market Hypothesis (1970), which assumes all market actors behave rationally and independently.

CONCLUSION

This study examines herding behavior in three markets during the COVID-19 pandemic: Indonesia, Vietnam, and the United States, representing developing, frontier, and developed markets, respectively. Analyzing daily stock closing prices from 2019 to 2023, the research found no statistically significant evidence of herding behavior in any of the markets during the specified periods, despite some negative coefficients that did not meet the threshold for significance. While these findings align with previous studies in Indonesia, they contradict reports of herding in Vietnam, potentially due to differences in sample size and observation periods. The limitations of this study include a sample restricted to the 100 largest stocks, which may not capture broader market dynamics, and a relatively short time frame that could affect the robustness of the conclusions. Consequently, while the study accepts the null hypothesis regarding the absence of significant herding behavior during COVID-19, further research with larger and more diverse samples is warranted to fully understand herding dynamics in various market conditions.

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