**Introduction**

It is well established that over the recent decades a significant progress has been achieved in explaining the behavior of financial markets. Probably one of the most influential concepts in the mainstream finance literature is that of market efficiency that was formulated by Fama (1970) among others. However, market efficiency rests on a series of assumptions that are mostly related to the existence of costly and asymmetric information, agency costs, market frictions such as transaction costs or limits to arbitrage and non-rational economic behavior. Rational behavior is a very popular concept among economic agents that is in the epicenter of many economic models. Since the pionneer work of economist John Keynes who made the notion of ‘animal spirits’ acceptable in economics in 1936, literature of financial economics is still treating animal spirits across financial markets with skeptism in spite of many notable attempts (Kahnemann, 2003, Shiller, 2005, Dai et al. 2020) and the award of the Noble Prize in Economics for systematic attempts to explore the psychological biases in economic decision-making (Kahneman, 2003).

As previously stated, market efficiency is achieved when markets are perfect while deviations from perfect markets can be attributed to various causes that might be related to developments in the macroeconomic environment or market frictions such as transaction costs and limits to arbitrage. Behavioral biases and other deviations from rationality such as herding or other positive feedback behavior classify as potential drivers of market inefficiency as well (Aggarwal, 2014). Some of these forces against market efficiency can be mitigated, but they cannot be eliminated. Thus, while there are many self-correcting forces that move markets towards efficiency, there are also many obstacles and costs that these equilibrating forces must overcome.

Financial markets that are dominated by agents’ actions have been a perfect setting to study human behavior and in particular the occurrence of various biases since the seminal study of Tversky & Kahneman (1974). Literature on the behavioral effects on decision making has flourished in recent decades (see Aggarwal, 2014 for a detailed review). Behavioral economics that lie in the intersection of psychology and economics attempt to shed more light on these biases and how they affect decisions made by agents acting under cognitive and emotional constraints (Mullainathan & Thaler, 2000). Human behavior that is by nature prone to heuristics, emotional biases

and framing effects (see Aggarwal, 2014) might result in sub-optimal decisions that in turn cause market inefficiencies and market failures.

Under this context, market participants and financial economists provide increasingly convincing evidence that imitative behavior is widespread in financial markets (Andrea Devenow and Ivo Welch, 1996). This correlated trading behavior of investors at large scale could pose significant threats to financial stability since they might increase volatility and create headaches for policymakers and supervisory authorities (Demirer et al., 2010).

Therefore, the concept of herding behavior started to gain the attention of researchers and academics not earlier than the 1990s, when the studies of Banerjee (1992) and Bikhchandani et al. (1992) appeared. Literature on herding is voluminous but still remains inconclusive. Spyrou (2013) and Komalasari et al. (2022) provide some excellent reviews of the relevant studies. Herding studies have expanded across the behavior of individual investors across all financial markets namely stock markets (see inter alia Demirer & Kutan 2006, Chiang & Zheng, 2010, Ukpong et al. 2021), bond markets (see inter alia Galariotis et al. 2016), commodities’ markets (Demirer et al. 2015, Babalos & Stavroyiannis, 2015, Babalos et al., 2015, Júnior et al. 2020, Youssef, 2022), real estate markets (see inter alia Philippas et al. 2013, Lesame et al. 2024) using returns data. Another strand of literature focus on herding behavior of institutional investors such as money managers (Jiang & Verardo, 2018), financial analysts (Leece & White,2017) and FX market forecasters (Tsuchiya, 2015) employing mostly information from transactions data. Most recently, herding behavior of investors in cryptocurrency markets has received the attention of literature (see inter alia Bouri et al. 2019).

Herding has been in the epicenter of a heated discussion that seeks robust empirical evidence in an attempt to confirm that correlated actions of investors at a large scale could induce market instability and volatility. Likewise, the above argument could work the other way around that is herding is more intense during market turmoil or increased volatility. Welch (2000) points out: "Herding in financial markets, in particular, is often presumed to be pervasive, even though the extant empirical evidence is surprisingly sparse". Studies on herding examine the behavior of investors towards market as a whole or at a sector level. Researchers have been concerned with herding activity across sectors in the US or in an international context with contradictory results (see inter alia Christie and Huang, 1995, Choi and Sias, 2009, Litimi et al., 2016). Herding behavior might vary across sectors probably because of the specific style of the industry, the economic conditions that might affect each sector or the trading patterns of investors in certain industries. Henker et al. (2006) find that herding is more prevalent in industries such as materials, consumer staples and financials. Gebka and Wohar (2013) employing data for 32 countries find that herding is more intense in sectors such as basic materials, consumer services, and oil and gas and this behavior might be the result of a group of investors that follow each other in and out of markets, overconfidence, or excessive flight to quality. They also stressed that testing herding towards market could underestimate the real effect of herding behavior and research should try to shed light on the behavior of investors at sector level. In the Malaysian market, Dehghani and Sapian (2014) find that herding behavior is only constrained to technology sector. Nine Asian markets were investigated by Zheng et al. (2017) for herding at sector level. They provided evidence in favor of herding in the Technology and Financial industries, but weaker in the Utility industry. Moreover, herding in certain industries was more intense during bear markets and low trading volumes. Returning to US, BenSaida (2017) confirmed the presence of herding behavior for 10 out of 12 sectors of US stock market during periods of financial crises and bubbles. Ukpong et al. (2021) document weak evidence of herding especially in the Financials, Real Estate, Telecoms and Utilities sectors for US market.

The present study…….

References

Aggarwal, R. (2014). Animal spirits in financial economics: A review of deviations from economic rationality. International Review of Financial Analysis, 32, 179-187.

Babalos, V., & Stavroyiannis, S. (2015). Herding, anti-herding behaviour in metal commodities futures: a novel portfolio-based approach. Applied Economics, 47(46), 4952-4966.

Babalos, V., Stavroyiannis, S., & Gupta, R. (2015). Do commodity investors herd? Evidence from a time-varying stochastic volatility model. Resources Policy, 46, 281-287.

BenSaïda, A. (2017). Herding effect on idiosyncratic volatility in US industries. Finance Research Letters, 23, 121-132.

Bouri, E., Gupta, R., & Roubaud, D. (2019). Herding behaviour in cryptocurrencies. Finance Research Letters, 29, 216-221.

Chiang, T. C., & Zheng, D. (2010). An empirical analysis of herd behavior in global stock markets. Journal of Banking & Finance, 34(8), 1911-1921.Demirer, R., & Kutan, A. M. (2006). Does herding behavior exist in Chinese stock markets?. Journal of international Financial markets, institutions and money, 16(2), 123-142.

Dai, W., Weder, M., & Zhang, B. (2020). Animal spirits, financial markets, and aggregate instability. Journal of Money, Credit and Banking, 52(8), 2053-2083.

Devenow, A., & Welch, I. (1996). Rational herding in financial economics. European economic review, 40(3-5), 603-615.

Demirer, R., Lee, H. T., & Lien, D. D. (2015). Commodity financialization and herd behavior in commodity futures markets. International Review of Financial Analysis, 39.

Fama, E. 1970. Efficient Capital Markets: A Review of Theory and Empirical Work.

Journal of Finance.25:2, pp. 383-417.

Jiang, H., & Verardo, M. (2018). Does herding behavior reveal skill? An analysis of mutual fund performance. The Journal of Finance, 73(5), 2229-2269.

Júnior, G. D. S. R., Palazzi, R. B., Klotzle, M. C., & Pinto, A. C. F. (2020). Analyzing herding behavior in commodities markets–an empirical approach. Finance Research Letters, 35, 101285.

Kahneman,D . 2003 Maps of bounded rationality: Psychology for behavioral economics. American Economic Review, 93 (2003), p. 1449-1475

Komalasari, P.T., Asri, M., Purwanto, B. et al. 2022. Herding behaviour in the capital market: What do we know and what is next?. Management Review Quarterly 72, 745–787.

Leece, R. D., & White, T. P. (2017). The effects of firms’ information environment on analysts’ herding behavior. Review of Quantitative Finance and Accounting, 48, 503-525.

Lesame, K., Ngene, G., Gupta, R., & Bouri, E. (2024). Herding in international REITs markets around the COVID-19 pandemic. Research in International Business and Finance, 67, 102147.

Philippas, N., Economou, F., Babalos, V., & Kostakis, A. (2013). Herding behavior in REITs: Novel tests and the role of financial crisis. International Review of Financial Analysis, 29, 166-174.

Tsuchiya, Y. (2015). Herding behavior and loss functions of exchange rate forecasters over interventions and financial crises. International Review of Economics & Finance, 39, 266-276.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and

Biases. Science, 185, 1124-1131.

Ukpong, I., Tan, H., & Yarovaya, L. (2021). Determinants of industry herding in the US stock market. Finance Research Letters, 43, 101953.

Youssef, M. (2022). Do oil prices and financial indicators drive the herding behavior in commodity markets?. Journal of Behavioral Finance, 23(1), 58-72.

Zheng, D., Li, H., & Chiang, T. C. (2017). Herding within industries: Evidence from Asian stock markets. International Review of Economics & Finance, 51, 487-509.