


HERDING BEHAVIOUR IN INVESTORS: A STUDY OF TADAWUL FINANCIAL MARKET

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ARTICLE INFO	<u>ABSTRACT</u>
<p>Article history:</p> <p>Received 05 June 2023</p> <p>Accepted 29 August 2023</p>	<p>Purpose: The study investigates herding behaviour in the Tadawul stock exchange based on daily data between the years 1999 to 2019 .</p>
<p>Keywords:</p> <p>Financial Market; Investors; OLS.</p> <div data-bbox="172 882 480 1128" style="text-align: center;">  </div>	<p>Theoretical framework: Existence of uncertain situations affect the confidence level of the investor. This leads to investors changing their approach from rational to behavioural wherein they prefer to follow the judgements of others, thus engaging in herding behaviour. Several factors such as institutional investment, external factors and fundamental factors impact herding behaviour.</p> <p>Methodology: The study uses OLS regression approach and accounts for the various factors such as institutional investment (percentage ownership in a stock, institutional ownership type, nationality) , external factors (global financial crisis, political instability, oil market volatility) and fundamental factors (P/E ratio, Share Turnover, Market Capitalization, Market Liquidity).</p> <p>Findings: The empirical results indicate that herding is not present during the period of study. External factors and fundamental factors do not significantly impact the Cross-Sectional Absolute Deviation (CSAD) and there is no evidence of herding when accounting for these variables. However, CSAD is significantly impacted with the percentage of institutional investment, ownership and the nationality of institutional investors and there is evidence of herding when accounting for these variables.</p> <p>Research Implications: As further scope the study proposes that the length of the time period may affect the findings and more robust analysis can be conducted by structural break models to understand the relative significance of the factors that may lead to herding during different time periods.</p> <p>Originality: Institutional investment related factors have a significant impact on Herding behaviour of investors in the Tadawul stock exchange.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i9.3695</p>

COMPORTAMENTO DE REBANHO EM INVESTIDORES: UM ESTUDO DO MERCADO FINANCEIRO DE TADAWUL

RESUMO

Objetivo: O estudo investiga o comportamento de rebanho na bolsa de valores de Tadawul com base em dados diários entre os anos de 1999 e 2019.

Enquadramento teórico: A existência de situações incertas afeta o nível de confiança do investidor. Isso leva os investidores a mudar sua abordagem de racional para comportamental, onde preferem seguir os julgamentos dos outros, engajando-se assim no comportamento de pastoreio. Diversos fatores, como o investimento institucional, fatores externos e fatores fundamentais, têm impacto no comportamento de pastoreio.

Metodologia: O estudo utiliza a abordagem de regressão do OLS e contabiliza os diversos fatores como o investimento institucional (participação percentual em ações, tipo de propriedade institucional, nacionalidade),

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fatores externos (crise financeira global, instabilidade política, volatilidade do mercado petrolífero) e fatores fundamentais (índice P/E, volume de negócios de ações, capitalização de mercado, liquidez de mercado).

Resultados: Os resultados empíricos indicam que o rebanho não está presente durante o período de estudo. Fatores externos e fatores fundamentais não afetam significativamente o Desvio Absoluto Transversal (CSAD) e não há evidência de rebanho ao contabilizar essas variáveis. No entanto, a CSAD é significativamente afetada com a percentagem de investimento institucional, propriedade e nacionalidade dos investidores institucionais e há provas de manejo ao contabilizar essas variáveis.

Implicações da Pesquisa: Como escopo adicional, o estudo propõe que a extensão do período de tempo pode afetar os achados e uma análise mais robusta pode ser conduzida por modelos de ruptura estrutural para entender a importância relativa dos fatores que podem levar ao rebanho durante diferentes períodos de tempo.

Originalidade: Fatores relacionados com o investimento institucional têm um impacto significativo no comportamento de Herding dos investidores na bolsa de Tadawul.

Palavras-chave: Mercado Financeiro, Investidores, OLS.

COMPORTAMIENTO DE MANADA EN INVERSORES: UN ESTUDIO DEL MERCADO FINANCIERO TADAWUL

RESUMEN

Propósito: El estudio investiga el comportamiento de pastoreo en la bolsa de valores de Tadawul basándose en datos diarios entre los años 1999 a 2019.

Marco teórico: La existencia de situaciones inciertas afecta al nivel de confianza del inversor. Esto lleva a los inversores a cambiar su enfoque de racional a conductual, donde prefieren seguir los juicios de los demás, involucrándose así en el comportamiento de pastoreo. Varios factores, como la inversión institucional, factores externos y factores fundamentales, influyen en el comportamiento de los rebaños.

Metodología: El estudio utiliza el enfoque de regresión OLS y da cuenta de los diversos factores como la inversión institucional (porcentaje de propiedad en una acción, tipo de propiedad institucional, nacionalidad), factores externos (crisis financiera global, inestabilidad política, volatilidad del mercado petrolero) y factores fundamentales (P/E ratio, rotación de acciones, capitalización de mercado, liquidez de mercado).

Hallazgos: Los resultados empíricos indican que no se presenta pastoreo durante el periodo de estudio. Los factores externos y los factores fundamentales no afectan significativamente la Desviación Absoluta Transversal (DCSA) y no hay evidencia de pastoreo al contabilizar estas variables. Sin embargo, la CSAD se ve afectada significativamente por el porcentaje de inversión institucional, la propiedad y la nacionalidad de los inversores institucionales y hay evidencia de pastoreo al contabilizar estas variables.

Implicaciones de la investigación: Como ámbito adicional, el estudio propone que la duración del período de tiempo puede afectar los resultados y un análisis más robusto se puede llevar a cabo mediante modelos de ruptura estructural para entender la importancia relativa de los factores que pueden conducir al pastoreo durante diferentes períodos de tiempo.

Originalidad: Los factores institucionales relacionados con la inversión tienen un impacto significativo en el comportamiento de los inversores en la bolsa de valores de Tadawul.

Palabras clave: Mercado Financiero, Inversores, OLS.

INTRODUCTION

In an efficient financial market, all investors can access information equally by all investors and each investor can rationally interpret them. However, due to limited abilities and market uncertainties, investors may make decisions based on heuristics. Presence of heuristics alters the investment decision approach of investors from rational to the broader approach i.e. behavioural. Herein, each investor analyses the market and makes their investment decision by considering his perception or judgment about the probability of risks (Fernández, et al, 2011).

One such behaviour is herding. In today's scenario, herding prevails in many financial markets where an investor without access to relevant information about the risky venture or risk-reward trade-offs manages their investment decisions by following the intent of others and imitating other investors' actions. Though in some cases herding could be efficient that is when the investors have similar issues and together set an investment decision, other than this case, mostly the intentional herding affects the efficiency of financial markets negatively (Bikhchandani & Sharma, 2000). This serves as the motivation for the current study.

Considering the variability in investor behaviour due to changes in decision approach from rational to behavioural finance, this study analyses the new investment decision approach and its presence in the Tadawul Financial Market between the years 1999-2019. The subsequent sections summarises the theoretical underpinnings of herding, empirically tests for the presence of herding in the Tadawul and assesses the impact of various factors in driving herding behaviour.

Traditional theories of financial market state that investors are well informed and consistent due to which they were aware of financial markets. This prevents the existence of any kind of difficulty in financial markets and eases the investment decision-making process (Byrne & Utkus, 2013). However, investors are not always rational and in fact, their investment decisions are dependent on the structure of the information and their characteristics. Thus, due to a lack of knowledge about factors that regulate an investor's decision, the expected utility of rational investors is not maximised and hence leads to the growth of a new approach called behavioural finance. By focusing on the cognitive and psychological theory, behavioural finance has examined the investor decision-making process and explained the economic aspect of investor decisions in the financial market. (Shiller, 2008) based on the assumption of risk aversion, risk denial, and bounded rationality, states that behavioural finance tries to explain how the presence of mental mistakes (cognitive errors) and investors' emotions regulate the decision-making skill of an investor. Some of the biases which exist in the financial market due to behaviour are frame dependence, herding, loss aversion, mental accounting, anchoring, disposition effect, overconfidence, heuristics, confirmation bias, familiarity bias, money illusion or innumeracy. All these biases show that human emotions such as overconfidence, greed and fear regulate the decision making of an individual.

The definitions of behavioural science show that the main significance of using this approach in financial markets is to have a clear understanding of the market dynamics and to determine the scope of investors' investment decisions considering the shortcomings or risks

of the financial market (Byrne & Utkus, 2013; Frankfurter & McGoun, 2002; Prosad, Kapoor, & Sengupta, 2012). (Waweru, Mwangi, & Parkinson, 2014) classify behavioural finance approach of investment into a heuristic decision process and prospect theory. Further, (Kengatharan & Kengatharan, 2014) examining the Colombo Stock Exchange stated that apart from heuristic and prospect theory, herding and market-based classification too is a part of behavioural finance. Heuristics refers to the behaviour wherein an investor either represents himself as some other investor (representativeness), uses easily available information (availability bias), overestimates his knowledge (overconfidence), exhibits gambler fallacy or anchoring. Prospect theory of behavioural finance refers to the tendency of an investor to avoid risk and minimise its loss by following risk aversion, loss aversion or mental accounting. Market aspect of behavioural finance includes information about price changes, customer preference, stocks past trends, or reaction of investors to price changes. Lastly, behavioural finance consists of herding behaviour. Characteristics of investors like financial literacy and demographic profile (age, or gender) affect the behaviour of investment in the financial market (Ansari & Moid, 2013; Luong, 2015; Ritter, 2003; Waweru et al., 2014) and investors will be more likely to suppress their own beliefs and copy the behaviour of others in the form of buying and selling decisions, other investors trading stock and volume choice, and speed of herding.

Particularly in context of Middle-East, Balcilar, Demirer, & Hammoudeh (2013) studied the different herding approaches prevalent in Gulf Arab stock markets of Abu Dhabi, Kuwait, Dubai, Qatar, and Saudi Arabia. Using the regime-switching model, the study undertook a cross-sectional analysis of herding behaviour in the GCC countries. Their study found that the frontier markets structure is different from the developed market and other than Qatar, all GCC markets have the existence of herding in a crash or extreme volatility. Further, Balcilar & Demirer (2013) examining the role of global risk factors in case of Borsa Istanbul found that herding behaviour is present in case of high and extreme volatility regime. U.S. market factors like the CBOT volatility index or S&P 500 index return significantly affect the regime transactions. Balcilar, Demirer, & Hammoudeh (2014) also state that although global factors like U.S. stock market performance, oil prices, or U.S. interest rate and risk indexes affect the herding behaviour of investors among all the factors dominant factor responsible for influencing herding level in Gulf countries is market volatility and these findings were also stated in Demir & Solakoglu (2016).

LITERATURE REVIEW

Samuelson (1965) first proposed the theory of the efficient market and explained that prices are unforecastable in nature in an informatively efficient market. Further, Fama (1970) defined the efficient market by stating that if securities prices can fully reflect information about securities then the market is said to be efficient i.e. with the entry of any new unpredictable information in the market, the prices of the stock immediately change by incorporating the effect of new information. Fama (1970) characterise the efficiency of the financial markets in three categories (i.e. weak form, semi-strong form, and strong form) by stating that if the investment is made based on past information then the market is weakly efficient, the decision of the investors based on the publicly available information is a semi-strong form of efficient, and if all the investments are made rationally after considering the impact of all internal and external information then the market displays strong form of efficiency. Thus, in an efficient market, there is the existence of a great number of rational profit maximising investors due to availability of freely accessible information about the securities from the movement in the prices (Tığan, 2015). Following the theory of Fama, the concept of Efficient Market Hypothesis (EMH) emerged wherein the focus was not on any technical or fundamental analysis but instead the priority was to keep a look on the current prices of the stock. However, Malkiel (2003) states that there is a possibility of predicting the prices of the stocks by computing price-earnings ratio or dividend. Irregularities in prices do exist and even the possibility of predicting the stock prices for short time reduces the efficiency of the market. Hsun & Lee (2006) also mention that information bias and inadequate information exist in the financial market in the form of leakage of public information. Such asymmetric information leads to over or under-reaction of the investors hence hampering the rationality and accessible information argument of the EMH. Dhir (2019) also highlighted that market does take time to respond to information. Hence, such criticism on the EMH led to the emergence of the new theory for analysing the efficiency of the market i.e. behavioural finance. Expected utility theory formulated by Daniel Bernoulli in 1738 and originally developed by John von Neumann and Oscar Morgenstern in 1944 focused on the aspect that investors determine the risk associated with each investment accurately (Mongin, 1999). Through a comparison of risk and uncertainty, the investor chooses to action wherein the highest expected utility is derived (weighted sum determined by multiplying the probability of risk with the outcome utility value). Being the normative model of rational choice, expected utility theory is the dominated decision-making method for investors. The application of this theory is based on three main aspects i.e. expectation about

the overall utility of the prospect, asset integration acceptable if the final utility is greater than the utility of the asset alone, and utility is the concave function (risk-averse investor) as individual prefer to opt for certain prospect instead of a risky prospect (Fulfer & Maille, 2018). In expected utility theory, as the derivation of final utility is weighted based on probabilities, the choice should be based on examination of utility as per probability but choice problems like certainty effect (people overweight outcome involving certainty) or isolation effect (discard components shared by all prospects) could lead to inconsistency in the behaviour of investors and tend to make them more averse towards small losses or ambiguity (Wolitzky, 2015). This criticism of expected utility theory eventually led to the development of an alternative concept for assessing investors behaviour under risk i.e. Prospect theory (Kahneman & Tversky, 1979).

In 1979, presenting the critique to the Prospect theory, Kahneman & Tversky presented a descriptive model for decision making under risk i.e. “value is assigned to the losses or gains of a decision rather than the final assets and probabilities are replaced by the weights of decision” (Ahmad, 2013). As people instead of thinking in terms of assets consider gain or loss as the means of decision making, the choice is based on the deviation from the reference point (Fulfer & Maille, 2018; Kahneman & Tversky, 1979). This reference point is like a status quo wherein small or moderate deviation of asset position is not the one which influences the preference of investors. Considering the psychological aspect of the investors, prospect theory states that in the domain of gains or well-running environment individuals are more of risk-averse while in case of crisis or losses individuals relatively seek risks i.e. are risk lover (Lavy, 1992; Papamikrou, 2017). The behaviour of investors is different in the situation of loss or gain and due to this sensitivity towards the changes decreases as the investor is moving away from the reference point (reflection effect). Though in the situation of loss, investors act as risk-lovers, they place more value to the current possession of things compared to what they could have. This loss aversion and endowment effect (current possession over-valuation) lead to more entitlement for the compensation of actual losses compared to the foregone gains (opportunity cost) (Holmes et al., 2011; Lavy, 1992). Thus, laying the chances of bias i.e. overweigh certainty-risk averse, disregard options that are common to both – risk lover in deviation, and consider high weightage of losses – risk-averse (minimise loss); prospect theory defines that the behaviour of investors is based on the situation of gain or loss (Barberis, 2012; Papamikrou, 2017).

Countering the initial assumption of rationality of investors, the new concept stated that investors could sometimes be irrational and make their investment decision. Shefrin & Statman

(2000) examined the new financial theory and mentions that the decision of financial investment is based on knowledge as well as psychology. Based on their own experience, culture, beliefs, knowledge, judgements, and needs; an investor makes their investment decision (Yildirim, 2017). Thus, behavioural finance refers to the theory wherein the decision of the investor is not just based on the rational aspect of comparing risk and return but also include the psychological effect of the investor on the financial decision making. Das & Panja (2019) identified that due to the usage of psychological aspect while having financial decision, there are chances of occurrence of many biases in the investment behaviour i.e. availability, representativeness, gambler's fallacy, herding, overconfidence, or anchoring. All these biases led to irrational decisions by the investor, hence influencing the financial environment of the economy.

Among all the biases herding is one of the most witnessed behaviour of investors. Existence of uncertain situations affect the confidence level of the investors and as a result many-a-times, investors instead of following their rational thinking, prefer to follow the judgements of others. This behavioural aspect of following others is called herding.

Kang (2013) stated that herding could be of two types i.e. spurious herding wherein group of investors who are in the same situation unintentionally take a similar decision, and intentional herding wherein investor instead of rationally thinking about the investment intentionally take investment decision by following others. Lindhe, (2012) states that in case of spurious herding, investors are bound to take a common decision, hence the outcome of spurious herding is efficient. Intentional herding is due to individual investor idiosyncrasy and fragility, hence the outcome is inefficiency and there are chances of high systematic risk and volatility in the market.

Further, Zheng et al(2015) characterised herding based on the causing it and states that the factors like imperfect information, compensation structure, and reputation are some of the main factors which tend to cause herding behaviour.

Bikhchandani & Sharma, (2000) explained information-based herding is where due to the existence of private information and difference in the quality of information available to each individual; investors prefer to follow others to avoid losses. As the stock market in the Middle East is not one of the major sources of external finance, due to this aspect, investors are not aware of the financial market. Thus, while investing, most investors follow the investment decision of the majority. However, sometimes when an investor decides in early-stage and

financial loss occurs, then investors from the next time invest in the opposite direction. These variations in investment decisions bring volatility in the market (Jyoti & Amalesh 2017).

Apart from imperfect information, the compensation structure to attracts herding behaviour. Thus, the second type of herding is compensation-based herding (Bikhchandani & Sharma, 2000). As institutional investors are more concerned about the reward and cost imposed on them due to externalities, based on the high return aspect, institutional investors tend to make their investment decision.

Further, one more factor which leads to cause herding is the reputation of the investment instrument i.e. reputation-based herding. As the market position of the instrument defines the scope of gain from the particular investment, institutional investors prefer to herd for the instruments with high reputation (Park & Sabourian, 2006).

Thus, herding can be mainly categorised into 4 types i.e.

a) **Psychology-related herding:** From the psychological point of view, herding is the irrational behaviour of investors wherein disregarding their personal information or belief about a particular investment or decision, investors blindly follow the actions of the group of people in the market. This psychological aspect could be automatic, primitive, and unconscious wherein emotions transmitted among the people influence their decision or could be deliberative, conscious, and controlled wherein social norms affect the decision. By interaction with the community, investors exchange information via word of mouth or observation. This formation of linkage between the community shapes the action of the individual and lead to follow the community without regarding their private information (Kameda et al., 2015; Komba, 2016).

b) **Information-Driven herding:** Information cascades is another form of rational conformity wherein individual ignore his information and base their decision on inferring the actions, words, or outcomes of the other people. This reliance on the other action's leads to making the herd behaviour as fragile (i.e. break with the availability of little new information) and idiosyncratic (i.e. behaviour combining the actions of predecessors). Herein, an individual believes his information as fallible while other actions as an informed decision. Thus, this mimicry of actions with blockage of private potential information leads to convergence of the behaviour of investors in the market to the undesirable outcome (Bikhchandani & Sharma, 2000; Fernández et al., 2011; Komba, 2016).

c) **Reputational Herding:** Reputational or the Principal-agent herding is mostly seen in the professionals wherein to avoid the hampering of reputation (the ability to assess information), the investor intentionally follows the behaviour of others. As the informative signals define how smart or dumb a manager is, thus with the presence of market judging agents or professionals like fund managers or institutional investors mostly avoid their information and follow the action of others. Herein, the sole purpose of the investor is to state that its performance or ability is not different from other counterparts or peers. Thus, on identifying that their information is different from the market actions, agents follow the market information signal and maintain their good reputation (Komba, 2016; Oprea, 2016).

d) **Spurious Herding:** Unintentional or spurious form of herding is the one wherein due to the availability of the same information and a set of similar characteristics, individuals take similar decisions. Herein, the motive of the investors is not to follow others but due to the professional experience, background information, or exposure to some stimulus, the investors behave similarly. Although in this form of herding, investors end up holding the same portfolio, due to the unintentional action, spurious herding yields efficient outcome (Lindhe, 2012; Bikhchandani & Sharma, 2000)

Kengatharan & Kengatharan, (2014) studied the investors characteristics of traders investors trading Columbo stock exchange in 2012 and found various factors that affect the investment decision of investors. As per their analysis- heuristics (overconfidence or gambler fallacy), prospect based decisions (loss aversion, mental accounting, or regret aversion), market-based decisions (past trends of a stock, changes in prices, or market information), and herding (choice of the stock and its volume for trading, buying and selling decision of investors, or herding speed) are the main factors which influence the decision making of an investor. Among all these factors the market and herding related factors had a major impact on the investment behaviour of investors (Luong & Ha, 2011).

Al-Tamimi, Alwan, & Rahman, (2011) analyzed the financial market of the UAE from the period 1990-2015 for 17 companies using regression model and stated that the internal factors of the company like earning per share and dividend per share have an impact on the stock price of the company. Further, Ozlen, (2014) examined the stock market of Istanbul and stated that the factors like stock market turnover ratio, price/earnings ratio, earning per share, current ratio, book value, and book to market value are considered to have a strong impact on

the stock value of the company; but majorly book value, price to earnings ratio, and turnover ratio are the factors which have a significant impact on the stock value of the companies. Deo & Sundar, (2015) also analyzed the factors which influence the investment decision and determines that in a capital market like Indian stock Exchange, firm image, financial requirement, share price, and dividend received from the investment are the major factors which determine the stock value. Khan, Afrin, & Rahman, (2015) also analyzed the factors influencing investment decision of investors in Bangladesh and identified that dividend, share price, and fluctuation in the market have a significant impact on the stock value. Joshi & Batra, (2017) analysis of the Indian stock market states that price to earnings ratio, earning per share, the market value of the company, volatility, and liquidity level of the stocks are the main influencer in the value of stocks.

Hence, all these studies suggest that price to earnings ratio, turnover ratio, the market value of the companies, volatility of market, liquidity, and the book value of the stocks have significant contribution in influencing the stock value.

Zheng, Li and Zhu, (2015) and Wong, (2019) studied the impact of P/E on the herding behaviour and stated that as the stocks having the high P/E are the growth stocks thus with the increase in P/E ratio, and found there is more evidence for the existence of herding as the investors anticipate the probability of growth in future. Hence, instead of following the information, investors tend to decide the investment based on market consensus. Their analysis has showed that more herding could be seen in the presence of high turnover ratio because the process of trading is less difficult in this case. For the impact of volatility on the herding behaviour, their study stated that due to the presence of more risk, asymmetric information and chances of having the declining market, the investors in the existence of high volatility tend to opt for herding instead of any rational behaviour. They also determined that the firms with large market capitalization show evidence of herding behaviour as investors tend to believe that there is more probability of earning higher returns from these companies.

Galarotis, Krokida and Spyrou, (2016) and Vo and Phan (2019) in their study stated that the markets having high liquidity tends to have more propensity of herding because investors have to bear fewer difficulties in the process of trading thus instead of focusing on the information, investors opt for market consensus for making their investment decision.

Hence, above stated internal factors shows that in case of high P/E, high shar turnover ratio, more volatility, large market capitalization, and high market liquidity; investors behave irrationally and follow the herding behaviour. Thus the literature provides the foundation for

the current study to use the fundamental factors such as P/E ratio, Share Turnover, Market Capitalization, Market Liquidity as independent variables affecting herding.

Global Financial Crisis

Kim *et al.*, (2013) in their study on the intercontinental comparison of the herding behaviour analyzed the behaviour of the investors concerning the global financial crisis. Using the global data from the Morgan Stanley Capital international for the period between 1996 to 2013, the research found the herding behaviour in the Asian, European, North American, South American, African, and middle eastern continents during the Asian financial crisis, dot com bubble burst, and global financial crisis. Laih and Liau, (2013) analyzed the Asia-Pacific stock markets to examine the herding behaviour. The analysis pointed out that herding is more prevalent in developing nations as daily price limits are more keenly observed there. Sharma, Narayan, & Thuraisamy, (2015) studied the Chinese stock market and stated that though herding is more prevalent during the time of crisis. However, in case of emerging markets, the presence of market stress in global financial crisis period creates the need for focusing on the market information rather than beliefs and hence leading to increase in the existence of herding behaviour.

Oil Market

The study by Ulussever & Demirer, (2017) analyzed the impact of variation in crude oil prices on the investors of the stock markets in the Gulf Cooperation Council. The analysis for the 10 years i.e. January 2003 to December 2013 has showed that oil price fluctuations significantly impacted the herding behaviour of investors. Considering the basic characteristics i.e. liquidity, market capitalization, trading volume, and the number of firms listed under the stock market; the analysis results suggest that Saudi Arabia is the dominant country wherein herding behaviour is highly influenced by the oil market. (Indārs & Savin, 2017) studied the correlation between the oil price variations and herding behaviour of investors for Moscow Exchange from April 2008 to December 2015. They found high liquidity led to stronger herding behaviour as high liquidity provides the facility of selling the stocks, thus investors tend to follow the market information without even verifying the stocks details. (Yousaf, Ali, & Shah, 2018) analysed the Pakistani stock market and found that herding to be present during the 2008 crisis. (Cakan *et al.*, 2018) analysed the herding behaviour of the investors in Russia, Turkey,

and Brazil from 2005 to 2015 speculation in the oil market was a leading cause of uncertainty promoting herding behaviour.

Political Instability

Asongu (2011) analyzed the political crisis of the Middle East and Africa to determine the risk that political instability imposes on the financial market. Focusing on the 2008 Kenyan political crisis, the research examined the stock indices of Botswana, Lebanon, Egypt, Mauritius, Namibia, Morocco, South Africa, Nigeria, and Tunisia for the period 2007-2008. The analysis pointed that herding existed in the African financial market which spilled over in the markets of Lebanon, Mauritius and Nigeria

Mertzanis & Allam, (2018) analyzed the Egyptian stock market after the 2011 revolution (Arab Spring) wherein the political changes led to a tremendous fall in the market capitalization. Study of the EGX30 index for the period 2003-2014 showed that the political revolution led to a short-lived impact on the herding behaviour of investors. Existence of uncertainty and political risk made investors more concerned about their investments and thus instead of following the market and having adventurous investments, investors were behaving more rationally. Further, they also state that there is a slow-motion impact of political instability on the stock market but the effect is persistent. Thus, regulations could be used for controlling the behaviour of investors.

Institutional Investment

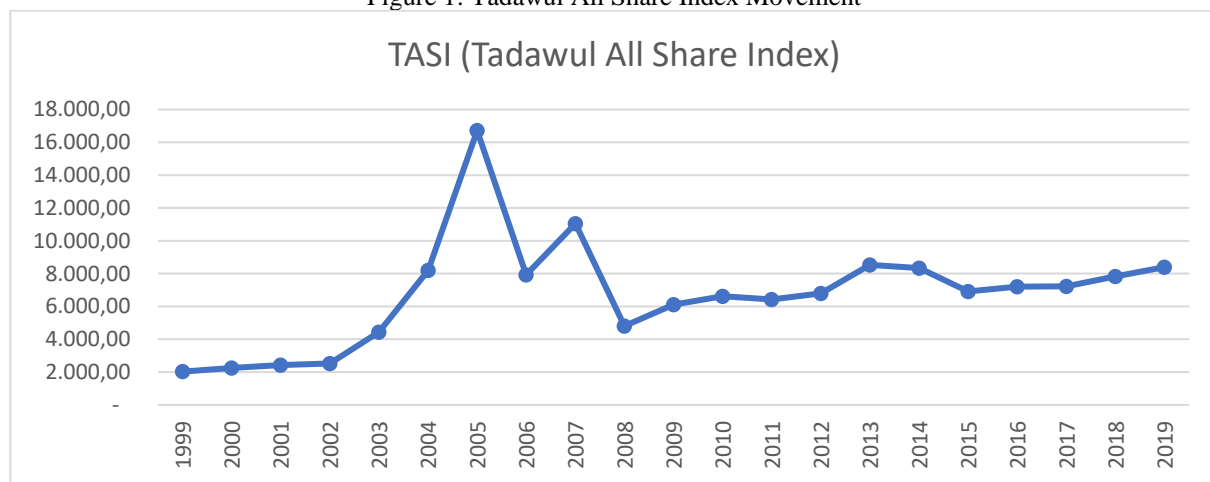
There are various sorts and categories of institutional investors, including accredited investors, institutional investors, ultra-high net worth individuals, social insurance pension funds, educational endowments, and family offices. Sovereign Wealth Funds increased their involvement in direct, high-profile, high-value investments between 2000 and 2010. Sovereign Wealth Funds from the area have increased their direct investing activity since the financial crisis. Local high net worth individuals and family groupings were among the biggest and most prominent regional participants in the asset management business across all asset classes in the GCC region. These have internal investment teams that are solely responsible for making investments; the teams are typically small, and family heads make the decisions (Wall Street Journal, 2012). According to data, institutional investors from the US, Europe, Japan, and the UK are significant players in the Saudi Arabian equity market and are among the top 10 institutional investors in a number of companies that are listed on the exchange. Additionally,

Youssef and Mokni (2018) discovered that the ownership of institutional investors throughout the various GCC markets was correlated with herding behaviour. According to Hammoudeh and Aleisa (2004), Saudi Arabian institutional investors are the main force behind the herding of other GCC markets. In this regard, research has not yet examined the impact of this conduct when taking into account institutional investors from countries outside the GCC, such as the United States, Europe, Japan, the United Kingdom, and own nation. Thus, this study aims to bridge the gap by identifying the impact of different institutional ownership types and nationalities in driving herding behaviour in Saudi Arabia's equity market.

SAUDI ARABIAN CAPITAL MARKET

Saudi Arabia is the leading exporter and producer of oil among the Gulf-Cooperation Countries (GCC) (Balcilar, Demirer, & Ulussever, 2016) wherein the main source of income is exports of oil. Saudi Stock Exchange or Tadawul is a stock exchange in Saudi Arabia was formally organized in 1984. Figure 1 shows the stock market movements of the exchange since 1999 till 2019. TASI plummeted in 2008 due to the global financial crisis (Alsabban, S., & Alarfaj, O, 2020). Since 2017 there has been a flat growth in the index due to the spillover effect of the GCC diplomatic crisis in 2017 (Arin, Caporale, Kyriacou, & Spagnolo, 2019).

Figure 1: Tadawul All Share Index Movement



Source: Prepared by Authors (2023)

Further, Table 1 shows the stock market condition of the Tadawul in 2019. Percentages of market capitalization and the value of shares traded are represented in terms of the total transaction in the Arab region. The market capitalization value of Tadawul in 2019 was 0.496 trillion USD and it consisted of 6196 institutional investors and 4,735,674 individual investors (Tadawul, 2019).

Table 1: Stock Market of Tadawul (Value in trillion USD)

<i>Market Capitalization</i>	<i>Market Cap %</i>	<i>Value of Shares Traded</i>	<i>Value of Shares Traded %</i>	<i>Turnover Velocity</i>	<i>Number of transaction</i>
0.496	41.96%	0.234	71.83%	46.81%	25.054

Source: Arab Federation Exchange (AFE, 2019)

DATA AND METHODOLOGY

For the current study we use the daily data for the stocks listed on the Tadawul Stock exchange between 1999 and 2019. Table 2 shows the trends some of the key market indicators.

Table 2: Summary of some key market indicators of Saudi Arabia.

<i>Year</i>	<i>TASI Index (Jan2017=5000)</i>	<i>Market value of shares (SARbn)</i>	<i>Number of shares traded (bn)</i>	<i>Market Capitalization (SARmn)</i>
1999	2,028.53	4.68	0.0430	56137.64987
2000	2,258.29	5.42	0.0460	65039.35587
2001	2,430.11	6.43	0.0566	77130.72866
2002	2,518.08	11.15	0.1447	74620
2003	4,437.58	49.71	0.4638	156825
2004	8,206.23	147.82	0.8582	305350
2005	16,712.64	344.89	1.0234	648150
2006	7,933.29	438.48	4.5366	325880
2007	11038.7	680.9	5.2099	1334931
2008	4803	520.2	5.0397	1537039.1
2009	6121.8	336.6	4.7581	1081758.3
2010	6620.8	202.4	2.7536	1263197
2011	6417.7	293	4.0644	1265363
2012	6801.2	514.4	7.1689	1394280.3
2013	8535.6	365.2	4.3633	1543464.6
2014	8333.3	571.8	5.8503	1981197.4
2015	6911.8	442.8	5.5064	1865264.5
2016	7210.4	308	5.6441	1475337.2
2017	7226.3	222.9	3.7220	1672990.8
2018	7826.7	232	3.3053	1883615.9
2019	8389.2	234.6	2.8036	2578867.4

Source: Tadawul Stock Exchange

Testing for Herding

Herding is primarily measured by using through dispersion based methodology. Dispersion based methodology can be divided into two types i.e. return dispersion and beta dispersion. Christie & Huang, (1995) defined the return dispersion method and stated that the behaviour towards stocks is dependent on the sensitivity to the market return. Return dispersion is measured through CSAD (Cross Sectional Absolute Dispersion). Therefore with an increase in dispersion investor would rely less on their information and follow the market information for decision making. Thus, the rise in return dispersion would lead to a rise in herding in the market. The cross-section model defined by Chang et. Al (2000) used for the measurement of return dispersion is shown below

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

Where,

$R_{i,t}$ is the stock return of asset i at time t and $R_{m,t}$ is the cross-sectional average of N returns in the aggregate portfolio at time t (Filip et al., 2015).

(M. A. Rahman et al., 2015) also suggest the following non-linear specification to detect herd behaviour in the market:

$$CSAD_t = \gamma_0 + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$$

Where,

a negative and significant γ_2 coefficient would indicate the presence of herding. Table 3 gives the summary statistics for CSAD and the market return. Further Table 4 the results of the OLS estimates of OLS estimates of the (Rahman et al., 2015) model by the full panel (stocks listed between 2007-2019), subsample-I (2007-2012), subsample-II (2013-2016) and subsample-III (2017-2019).

Table 3: Summary Statistics

	CSAD	Market Return (%)
Mean	31.44163	0.301504
Std.Dev.	13.59009	34.18689
Variance	184.6906	1168.744
Skewness	3.816957	0.523801
Kurtosis	25.2546	5.925966
ADF	-10.328***	-13.152***
Observations	24888	24888

Source: Author's Calculations

This table presents descriptive statistics of all daily time series over the sample period from January 1999 to December 2019. CSAD indicates the cross-sectional absolute deviation of daily returns of individual stocks. Market Return is the daily return of value of all shares traded in Tadawul. *** Significance at 1% level

For CSAD, a measure of the proximity of the individual returns to the market return, the mean value was 31.44. In the case of perfect correlation, the CSAD (Cross-Sectional Absolute Valuation of Stocks) value is zero, and the value increases as the individual returns begin to deviate from the market return. A higher value of the CSAD, therefore, implies higher market variations. We conduct stationarity tests whereby the variables appear to be stationary

using augmented Dickey-Fuller test statistics (Dickey & Fuller, 1979), both which are significant at the 1% level.

Table 4: OLS estimates of the model without controls and other factors across the different temporal subsamples

	Subsample-I	Subsample-II	Subsample-III
γ_0	26.463*** (52.86)	28.755*** (34.94)	28.149*** (69.54)
γ_1	0.171*** (4.49)	0.096* (1.81)	0.139*** (4.1)
γ_2	-0.003*** (-4.01)	-0.002** (-2.25)	-0.002*** (-3.17)
N	9924	10296	6816
R^2	0.37	0.34	0.44

Source: Prepared by Authors (2023)

This table presents the results of estimating model using the by the subsample-I (January 2007- December 2012), subsample-II (January 2013- December 2016) and subsample-III (January 2017-December 2019).

$$CSAD_t = \gamma_0 + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$$

Where,

CSAD_t is the equally weighted cross-sectional absolute deviation on month t, and R_{m,t} is equally weighted market return on month t. t-statistics based on the Newey–West robust standard errors are in parentheses.

* Significance of the coefficient at 10% level. ** Significance of the coefficient at 5% level. *** Significance of the coefficient at 1% level

Positive and significant coefficient of γ_1 indicates that stock dispersions increase when absolute market return increases. Negative and statistically significant coefficient of γ_2 shows asymmetry and non-linear relation of CSAD along with R_{m,t} in study period. This provides evidence of herding. Thus, empirically it can be established through the results of Table 3 that herding is present in all the subsample periods.

Global Financial Crisis and Tadawul

Saudi Arabia as a part of the GCC region experienced an oil price boom during the period 2003-2008 due to which the fiscal and external balances of the economy as well as the region strengthened. The overall growth in the oil prices in the GCC region was recorded during this period at an average of 6.6%, a rate of 3% higher than the pre-oil price boom period. Fiscal space was available for meeting the policy-based challenges of reducing unemployment and

diversifying the economy along with an increase in the budget allocation to non-oil areas by 10% and the GCC investment projects from \$300 million in 2004 to \$2.5 trillion in 2008. The gain in oil revenues led to a fiscal surplus of 26% by 2008. However, in 2008, global financial crisis tightened the financial conditions and led to decline in prices, liquidity shortage and decrease in oil production. Along with an impact on the banking and corporate liquidity, the capital inflows were reversed and the confidence of investors declined in the GCC region (Khamis et al., 2010). This is visible from the graph (Figure 4) below wherein TASI (Tadawul All Share Index) fell from 11,038.66 in 2007 to 4,802.99 in 2008. Although TASI began to improve in 2009 however, these extreme movements in the prices along with less confidence of investors created the situation of uncertainty and directed the investors' behavior towards following the market consensus instead of rational thinking for investment (Laih and Liau, 2013). Tadawul Index (TASI) reduced from 8333.3 to 6911.76 points. Although average oil price of GCC region was still low in 2016 i.e. 45.13 USD per barrel, the stock market has begun to improve and later on as the oil prices increased from 2017 to 2018, the value of stock market indexes also rose by a large amount. This simultaneous movement in the prices of the oil and capital market lead to dependence of investor decision on the fluctuations of the oil prices. Hence, following the oil market volatility, investors react to the movements in oil prices (Mensi, 2019).

Political Instability

In 2011, a wave of political protest began in Tunisia and then spread to the entire Arab world which not only transformed the political landscape of the Arab region but also threatened many GCC region including Saudi Arabia. The call for democracy during the Arab Spring movement aimed at converting authoritarian and autocratic regimes into democratic one led to the creation of new geographical dynamics, uncertainty, security challenges, and even regional instability (Baabood, 2014). Combining the domestic and external shocks, this political instability led to worsening the shape of the economies as compared to the pre-spring state. They suffered from low economic growth, high unemployment rate, deterioration of security, uncertainty presence for foreign and domestic investors, and fiscal and external imbalances due to high oil prices (B. Y. M. Khan, 2014). The uncertainty, social unrest, and political turmoil affected the confidence of investors along with limiting the information available to them. Thus, to cope with the situation, instead of following a rational investment mechanism, the investors opted for herd method and made herding based investments (Asongu, 2011).

The background research of the study shows that in today's scenario, the investment decision is based on the behavioral finance approach wherein rational thinking of investors is not a matter of concern. Instead, the psychological state of the investors and his emotions are considered as the factors which influence the investment decisions. Among all the behavioral finance criteria, herding is one of the most prevalent approaches that could be seen worldwide. Investors suppress their judgements and prefer to follow other peoples' perspectives. This irrational herding behaviour tends to cause changes in the stock price hence leading to problems like asset price bubble in the long run. Thus, considering the relevance of herding in today's scenario, this study is directed towards analyzing the herding behaviour witnessed in the stock markets of selected GCC countries.

Though an investor opts for herding in the situation of uncertainty, there are various factors which influence the internal investment decisions of an investor. Before making any investment decision, an investor focuses on examining certain pricing and market factors which define the basic characteristics of a stock like Price to Earnings ratio (P/E), which shows the value of the firm, shares turnover which defines the liquidity of shares and specifies that highly liquid assets have less risk associated with them, price volatility which defines the diversion of the returns from its average wherein high volatility represents a risk, market capitalization which depicts the size of the firm wherein the large firms have more chances of earning a return, and market liquidity which defines the nature of market wherein highly liquidity is less risky when associated with an expected return. All these internal factors influence the sentiment of the investor to make any investment decision.

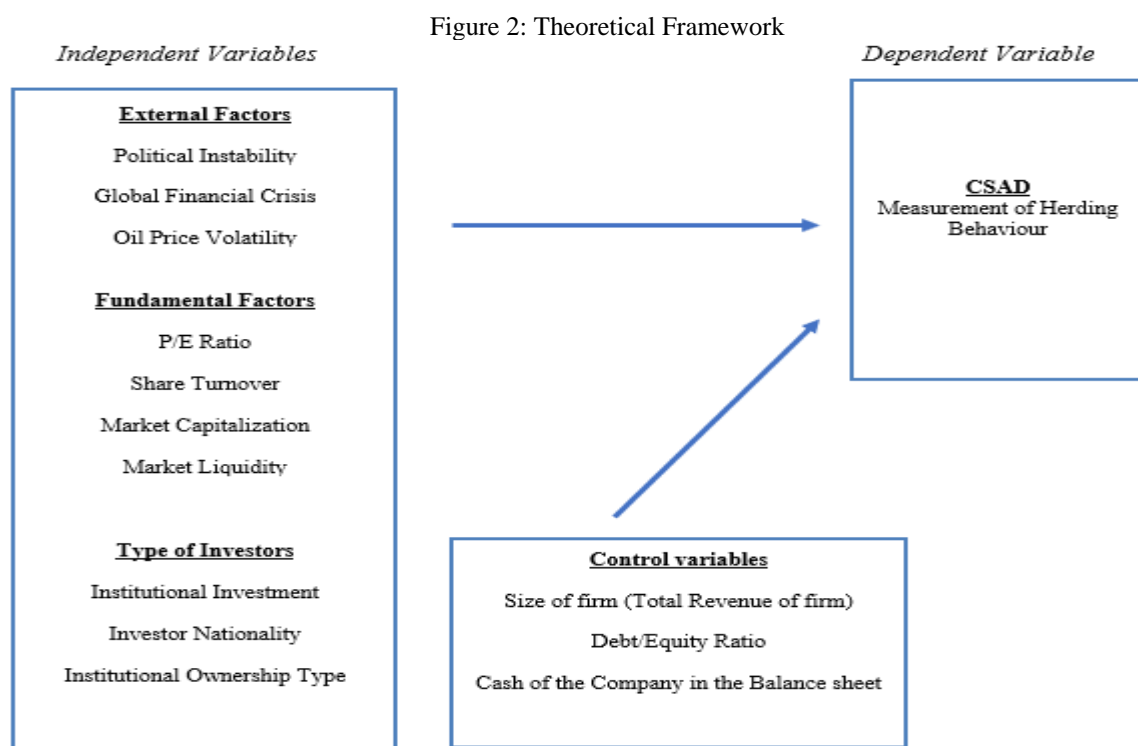
Further, the investment decision is also influenced by changes in economic conditions. With the occurrence of the global financial crisis in 2008, although Saudi Arabia has experienced gains in fiscal position due to the oil price boom, the recession caused oil production to drop drastically. Moreover, the financial market experienced a decrease in share prices and a liquidity shortage. Along with affecting the liquidity and credibility, the confidence of the investors too was shaken. This prevented investors from making any rational decisions and to minimise the risk which rose from this uncertainty, investors followed the market consensus.

The sharp decline in oil prices which occurred due to the global financial crisis and reduced oil production also bought volatility in the oil market, thus directing investors to move out from the oil market and invest in the capital market for creating the way of earning.

With the movement in the investors' behaviour and the policies of the government, the economies began to settle. But in 2011 a political revolution for democracy began in the Arab region which worsened the situation. The security in the region deteriorated, creating a situation of uncertainty, political turmoil, and social unrest which not only led to disturbing the fiscal and external balance but also devastated the confidence of domestic and foreign investors. This sense of doubt and uncertainty prevented investors from following their information for investment. Thus, the conditions can induce herding behaviour in the stock market of the Saudi Arabia. Political uncertainties, financial crisis, and oil market fluctuations create more sources of herding and increase the financial stress on the economy (Xu, 2017). Though studies exist where authors have individually analyzed the impact of these events (Arin et al., 2019; Bley & Chen, 2006; Hassan, 2015; Mensi, 2019; Saif, 2009), the focus was never on examination of the simultaneous impact of internal and external factors on the herding behaviour of institutional investors i.e. price to earnings ratio, price to book value, market capitalization, market price indexes, oil prices, and share turnover.

Theoretical Framework

Based on the discussion above and in accordance with the aim of this study, the theoretical framework can be represented in the figure below.



Source: Prepared by Authors (2023)

The above figure shows the herding behaviour of investors in Tadawul. As an excess return on the stock is the difference between the returns earned on stock this year and the past year, this rate shows the condition of the stock market. In a financial market, herding behaviour influences the amount of investment, therefore excess return on a stock is affected by the herding measure (i.e. the difference between the average buyer ratio in the market and the buyer ratio of a particular stock). Using the return-based dispersion methodology for measuring the herding behaviour of investors, the impact of various factors is being determined on the excess return of stocks. As the changes in the prices of the assets, market-based variation and oil market have an impact on the behaviour of investor and investment decision, thus the influence of each of the aspect is determined. The analysis of the fundamental factors is done considering the price-to-earnings ratio (P/E), market capitalization, and share turnover alongside the influence of the impact of market capitalization and market liquidity risk is determined on the excess return of stocks. For the examination of external factors' impact, the oil price volatility are considered to be the influencing factors. Further, the comparison will be done to determine whether the existence of a global financial crisis or political instability influence the herding behaviour of investors. Thus, based on the linkage of each of the factor with the excess return on stocks, the hypothesis for the study is formulated. Lastly for the analysis of investor type, the theoretical framework considers the impact of Institutional Investment depicted as percentage of institutional investment, Investor Nationality (based on the region of residence of the institutional investor) and Institutional Ownership Type (Sovereign Wealth Fund, Traditional Investment Manager, VC/PE Firm, Family Office/Family Trust, Government Pension Plan Sponsor, Hedge Fund Manager/CTA) within the model.

Hypothesis Development

Saudi Arabia being an the leading exporter within GCC region experiences high volatility in its oil market. With high risk in the generation of the revenues from the oil market, the investors move towards the capital market. However, with the presence of uncertainties in the financial market, investors tend to follow herding. There are various fundamental factors (P/E, share turnover ratio, market capitalization and market liquidity) and external factors (Oil price volatility, Global Financial Crisis, Political Instability) which influence the herding behaviour of the investors alongside the institutional investment related factors. Based on the theoretical framework of the study and the linkage between the factors and the herding

behaviour, the hypothesis for studying the herding behaviour of investors in the Saudi Arabian Financial Market is formulated:

The first hypothesis of the study is based on the aspect that the change in the prices of the assets influences the decision of the investors.

H₀₁: There is no impact of fundamental factors on the herding behaviour of investors

H_{A1}: There is an impact of fundamental factors on the herding behaviour of investors.

Herein, considering the price-to-earnings ratio (P/E), share turnover, market capitalization and liquidity as the independent variables, the influence of each of the aspect is determined on the excess return of the stocks. As rise in P/E and share turnover shows that there are more chances of earning profit in future and the stocks are liquid thus, investors tends to herd towards buying. As high market capitalization depicts the size of the firm along with reducing the asymmetry of information and high market liquidity reduce the difficulty in the process of investment, thus investors tend to herd towards buying. Thus, through the examination of fundamental factors influence on herding behaviour, each aspect impact is determined.

The second hypothesis of the study is to determine the influence of external factors on the investor's decision i.e.

H₀₂: There is no impact of the external factors on the herding behaviour of investors

H_{A2}: There is an impact of external factors on the herding behaviour of investors.

In the above hypothesis, considering the oil price volatility and herding measure as independent variables, the influence on the excess return of stock is determined. High oil price tends to create an opportunity of earning profit thus directing investors herd towards selling while the presence of high oil market volatility brings in the risk of loss for the investors thus directing investors herd towards buying. Hence, determining the influence of external factors on herding, the impact is assessed on the excess return of stocks.

The study focuses on determining the variation in the behaviour of investors in the existence of any crisis. Thus, the behaviour of the investors in the existence of a global financial crisis, another external factor, is tested in the regression model taking global financial crisis as an independent dummy variable taking value 1 for the years when there was a global financial crisis and 0 otherwise. The existence of the global financial crisis of 2008 creates the market stress thus, instead of believing on their information, investors tend to opt for herding. Herein, instability of the financial market direct investors herds towards selling. Hence, considering the

influence of financial market changes, the impact of the global financial crisis is determined on investor behaviour.

Political instability is also considered to be an external factor impacting excess return on stocks. The study determines the influence of investor's behaviour in case of political instability. Political instability entails lower economic growth, uncertain environment for investors that leads to a decline in investment confidence and external imbalances which can impact the investment strategy of investors as well as their ability to undertake rational investment decisions and rely more on behavioural finance strategies such as herding based investments.

Lastly the study focuses on the impact of institutional investment on herding behaviour. The study looks at the impact of percentage of institutional investment in a company, institutional investor type and nationality to ascertain a more detailed impact on the herding behaviour. The null hypothesis for each of the factors underlining institutional investment is tested and formulated as stated below.

H_{03.a}: There is a no relationship between institutional investors' investment in herding behavior in Saudi Arabian equity index.

H_{03.b}: There is a no relationship between institutional investors' fund ownership in affecting herding behavior in Saudi Arabian equity index .

H_{03.c}: There is a no relationship between institutional investors' nationality in affecting herding behavior in Saudi Arabian equity index .

EMPIRICAL RESULTS

After establishing the presence of herding we ascertain the impact of the control factors, institutional investment related factors, fundamental factors and, external factors on herding and subsequently the excess returns on the stock.

Following from the Theoretical Framework outlined and the approach used in Rahman et al. (2015). We determine if herding as measured by CSAD is impacted by Fundamental Factors, External factors(EF) and Institutional Investment Related Factors using OLS empirical model was applied as used in (Fang,Noe& Tice, 2009) and (Baddeley, Burke, Schultz, & Tobler, 2012). The base regression equation is depicted below which is modified further using the impact of lagged variables in the model.

$$\begin{aligned}
CSAD_{i,t} = & \beta_0 + \beta_1 |R_{m,t}| + \beta_2 R_{m,t}^2 + \beta_3 \text{Total Revenue of Firm}_{i,t} + \\
& \beta_4 \text{Debt to equity ratio of Firm}_{i,t} + \beta_5 \text{Cash of Company}_{i,t} + \\
& \beta_6 \text{Institutional Investor investment}_{i,t} + \\
& \beta_7 \text{Institutional investor nationality dummy}_{i,t} + \beta_8 \text{Market capitalisation}_{i,t} + \\
& \beta_9 \text{PE Ratio}_{i,t} + \beta_{10} \text{Share Turnover}_{i,t} + \beta_{11} \text{Liquidity}_{i,t} + \beta_{12} \text{Oil Price Volatility} + \\
& \beta_{13} \text{Global Financial Crisis Dummy} + \\
& \beta_{14} \text{Political Instability Dummy} + \beta_{15} \text{Institutional investor ownership dummy}_{i,t} + \\
& \varepsilon_{i,t}
\end{aligned}$$

Table 5: OLS estimates of the model using control variables and P values based on Robust Standard errors

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
const	0.010 6 0.000	0.010 9 0.000	0.011 0.000								
marketreturn	0.509 9 0.005	0.508 3 0.005	0.507 0.004	0.507 0.004	0.507 0.004	0.507 0.004	0.507 0.004	0.379 6 0.002	0.380 8 0.002	0.343 0.002	0.336 7 0.002
marketreturn2	- 2.370 2 0.097	- 2.365 4 0.097	- 2.359 7 0.061	- 2.359 7 0.061	- 2.359 7 0.061	- 2.359 7 0.061	- 2.359 7 0.061	- 9 0.000	0.019 0.02 0.000	0.02 0.018 0.000	0.018 0.017 0.000
CashInCompany_SAR	- 2.95 E-11 0.000	- 2.99 E-11 0.000	- 2.99 E-11 0.000	- 2.99 E-11 0.000	- 2.99 E-11 0.000	- 2.99 E-11 0.000	- 2.99 E-11 0.000	- 3.81 E-11 0.000	- 3.81 E-11 0.000	- 2.92 E-11 0.000	- 2.42 E-11 0.000
DebtToEquity	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 6 0.000	- 0.000 4 0.000	- 0.000 4 0.000	- 0.000 3 0.000	- 0.000 2 0.000
Total Revenue_SAR	- 1.45 E-12 0.000	- 3.91 E-11 0.000	- 3.91 E-11 0.000	- 3.91 E-11 0.000	- 3.91 E-11 0.000	- 3.91 E-11 0.000	- 3.91 E-11 0.000	- 1.27 E-10 0.000	- 1.27 E-10 0.000	- 1.15 E-10 0.000	- 1.24 E-10 0.000
Institutional investment	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 3.23 E-05 0.000	- 2.47 E-05 0.000	- 2.48 E-05 0.000	- 1.83 E-05 0.000	- 1.44 E-05 0.000
Gcc			0.011 0.000	0.005 0.000	0.003 0.000	0.005 0.000	0.004 0.000	0.004 0.000	0.004 0.000	0.003 0.000	0.004 0.000
America				0.005 5 0.000	0.003 7 0.000	0.005 5 0.000	0.004 5 0.000	0.004 0.000	0.004 0.000	0.003 9 0.000	0.004 0.000
EU					0.003 7 0.000			0.004 0.000	0.004 0.000	0.003 9 0.000	0.004 0.000
Asia							0 0.000	- 3.51 E-16 0.000	6.80 E-17 0.000	- 6.04 E-16 0.000	- 5.22 E-16 0.000
MarketCapitalisation(SAR)								9.68 E-09 0.000	9.65 E-09 0.000	8.33 E-09 0.000	8.49 E-09 0.000
PERatio								1.56 E-05	1.56 E-05	1.12 E-05	8.77 E-06

									0.000	0.000	0.000	0.000
ShareReturn									7.83	7.76	7.35	5.92
									E-06	E-06	E-06	E-06
									0.000	0.000	0.000	0.000
Liquidity									8.93	1.16	7.72	9.07
									E-18	E-17	E-18	E-18
									0.000	0.000	0.000	0.000
OilVol										-	-	-
										7.74	2.05	2.28
										E-06	E-05	E-05
										0.000	0.000	0.000
Fin crisis										0.009	0.009	
										4	1	
										0.000	0.000	
Polit. Crisis4												-
												0.001
												8
												0.000
R-squared:	0.172	0.174	0.176	0.176	0.176	0.176	0.176	0.174	0.174	0.22	0.226	
Adj. R-squared:	0.172	0.174	0.176	0.176	0.176	0.176	0.176	0.174	0.174	0.22	0.226	
F-statistic:	8786	5914	8136	8136	8136	8136	8136	6026	5360	6448	6082	
Prob (F-statistic):	0	0	0	0	0	0	0	0	0	0	0	
Log-Likelihood:	7.66	7.66	7.67	7.67	7.67	7.67	7.67	7.66	7.66	7.73	7.74	
	E+05	E+05	E+05	E+05	E+05	E+05	E+05	E+05	E+05	E+05	E+05	E+05
AIC:	-	-	-	-	-	-	-	-	-	-	-	-
	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.55	1.55	
	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06
BIC:	-	-	-	-	-	-	-	-	-	-	-	-
	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.55	1.55	
	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06	E+06

Source: Author's Calculations

This table presents the results of the regression using the by the time period (January 1999-December 2019)

Table 5 presents the OLS estimates of the regression equation after accounting for the various independent variables across the full time period along with the control variables. The evidence of herding can be found by a negative and significant coefficient for the market return square variable. There is evidence of herding until Model VII which indicates that in the absence of fundamental factors there is herding. Herding was absent after fundamental factors accounted for variables such as P/E Ratio, Share Turnover, Market Capitalization, Market Liquidity in the regression equation are added. Herding (as measured by CSAD) was absent in all years as considered in this study when considering the impact of the fundamental factors. Thus it can be inferred that herding behaviour has been absent. Similarly after accounting for external factors such as Political Instability, Global Financial Crisis, Oil Price Volatility also there is no evidence of herding. Interestingly the evidence of herding is only found when

looking at the models I-VII of the equation that accounts for the percentage of institutional investment ownership and the nationality of the institutional investors.

In the next steps, the regression equation is altered to account for lagged effects of the variables and the variables for the various Institutional Ownership Types. The results of the regression equation are presented in Table 6. Similar to the previous results even when accounting for the lagged effects, the evidence of herding is absent after accounting for the fundamental factors. Further when accounting for the various Institutional Ownership Types in Model XI, there is no evidence of herding. Thus from the results it can be inferred that herding is absent when considering the impact of the various Institutional Ownership Types and lagged effects of the variables. The evidence of herding is seen in models I-VII which consider the control variables, the percentage of institutional investment ownership and the nationality of institutional investors.

Table 5: OLS estimates using lagged effects and Institutional Ownership Types

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
const	0.009 6 <i>0.000</i>	0.009 8 <i>0.000</i>	0.009 9 <i>0.000</i>								
marketret urn	0.428 3 <i>0.005</i>	0.427 2 <i>0.005</i>	0.426 3 <i>0.005</i>	0.426 3 <i>0.005</i>	0.426 3 <i>0.005</i>	0.426 3 <i>0.005</i>	0.426 3 <i>0.005</i>	0.299 6 <i>0.003</i>	0.301 6 <i>0.003</i>	0.277 7 <i>0.003</i>	0.273 8 <i>0.003</i>
marketret urn2	- 2.383 8 <i>0.098</i>	- 2.380 6 <i>0.098</i>	- 2.376 6 <i>0.098</i>	- 2.376 6 <i>0.098</i>	- 2.376 6 <i>0.098</i>	- 2.376 6 <i>0.098</i>	- 2.376 6 <i>0.098</i>	- 0.015 8 <i>0.000</i>	0.015 9 <i>0.000</i>	0.014 6 <i>0.000</i>	0.014 5 <i>0.000</i>
CashInCompany_ SAR	- <i>0.000</i>	- 2.76E -11 <i>0.000</i>	- 2.80E -11 <i>0.000</i>	- 2.80E -11 <i>0.000</i>	- 2.80E -11 <i>0.000</i>	- 2.80E -11 <i>0.000</i>	- 2.80E -11 <i>0.000</i>	- 3.52E -11 <i>0.000</i>	- 3.52E -11 <i>0.000</i>	- 2.81E -11 <i>0.000</i>	- 2.43E -11 <i>0.000</i>
DebtToEquity	- <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 6 <i>0.000</i>	- 0.000 4 <i>0.000</i>	- 0.000 4 <i>0.000</i>	- 0.000 3 <i>0.000</i>	- 0.000 2 <i>0.000</i>
Total Revenue_SAR	- <i>0.000</i>	1.65E -12 <i>0.000</i>	3.44E -11 <i>0.000</i>	3.44E -11 <i>0.000</i>	3.44E -11 <i>0.000</i>	3.44E -11 <i>0.000</i>	3.44E -11 <i>0.000</i>	- 1.10E -10 <i>0.000</i>	- 1.14E -10 <i>0.000</i>	- 1.06E -10 <i>0.000</i>	- 1.12E -10 <i>0.000</i>
Institutional investment	- <i>0.000</i>	2.81E -05 <i>0.000</i>	- 2.81E -05 <i>0.000</i>	- 2.81E -05 <i>0.000</i>	- 2.81E -05 <i>0.000</i>	- 2.81E -05 <i>0.000</i>	- 2.81E -05 <i>0.000</i>	- 2.13E -05 <i>0.000</i>	- 2.05E -05 <i>0.000</i>	- 1.55E -05 <i>0.000</i>	- 1.25E -05 <i>0.000</i>
Gcc	- <i>0.000</i>	- <i>0.000</i>	0.009 9 <i>0.000</i>	0.005 <i>0.000</i>	0.005 <i>0.000</i>	0.005 <i>0.000</i>	0.003 3 <i>0.000</i>	0.003 5 <i>0.000</i>	0.003 4 <i>0.000</i>	0.003 4 <i>0.000</i>	0.000 9 <i>0.000</i>
America	- <i>0.000</i>	- <i>0.000</i>	- <i>0.000</i>	0.005 <i>0.000</i>	0.005 <i>0.000</i>	0.003 <i>0.000</i>	0.003 3 <i>0.000</i>	0.003 5 <i>0.000</i>	0.003 4 <i>0.000</i>	0.003 4 <i>0.000</i>	0.000 9 <i>0.000</i>

											0.000
Traditional Investment Manager											0.000
											9
											0.000
VC/PE Firm											0
											0.000
Corporate Pension Plan Sponsor											0.000
											0.000
Hedge Fund Manager/CTA											0
											0.000
Family Office/Family Trust											0
											0.000
R-squared:	0.238	0.24	0.241	0.241	0.241	0.241	0.241	0.238	0.257	0.288	0.292
Adj. R-squared:	0.238	0.24	0.241	0.241	0.241	0.241	0.241	0.238	0.257	0.288	0.292
F-statistic:	5645	4540	3819	3819	1.08E+05	1.08E+05	1.08E+05	8.15E+04	6.03E+04	6.65E+04	4.39E+04
Prob (F-statistic):	0	0	0	0	0	0	0	0	0	0	0
Log-Likelihood:	7.76E+05	7.76E+05	7.76E+05	7.76E+05	7.76E+05	7.76E+05	7.76E+05	7.76E+05	7.79E+05	7.83E+05	7.84E+05
AIC:	-	-	-	-	-	-	-	-	-	-	-
	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.56E+06	1.57E+06	1.57E+06
BIC:	-	-	-	-	-	-	-	-	-	-	-
	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.56E+06	1.57E+06	1.57E+06

Source: Author's Calculations

This table presents the results of the regression using the by the time period (January 1999-December 2019)

SUMMARY AND CONCLUSION

In an efficient financial market, information is equally accessible by all investors and each investor rationally interprets them. However, due to limited abilities and the presence of uncertainties in the market, heuristics can be seen in investors. The investment decision approach of investors from rational to the broader approach i.e. behavioral finance, one of the behaviours existing is that of herding. Herding is when an investor manages their investment decisions by following the intent of others and imitating other investors' actions. We test the presence of herding in context of the Saudi Arabian financial market by analysing data on Tadawul between January 1999- December 2019. This period was marked with the Global financial crisis in 2008 and political instability due to Arab Spring Revolution in 2011 and

diplomatic crisis from June 2017. It was found that herding was absent in the market by applying the empirical test on CSAD as developed by (M. A. Rahman et al., 2015). Further we use fundamental factors, external factors and institutional investment related variables along with as control variables to ascertain the impact on herding using OLS approach. Herding (as measured by CSAD) was present after accounting for control factors, percentage of institutional investment ownership and the nationality of institutional investors. Similar results were seen when accounting for the lagged effect model. However, when accounting for the impact of fundamental factors and the external factors, the results indicate absence of herding. The study thus finds that the herding in Saudi Arabia across the time period under study is significantly associated with the percentage of institutional investment ownership and the nationality of institutional investors.

The main contribution of this paper lies in the fact that it analysed the impact of various factors on herding simultaneously rather than individually. The future research can ascertain whether such results stand for the period of 2020 in the wake of the global pandemic Covid-19 and for other markets in the GCC region. The analysis of GCC region would be valuable in terms of presenting an broad views of herding trends in markets that are largely oil-centric. Further it would be valuable to ascertain if the herding behaviour in Saudi Arabian market can be witnessed when looking at the impact through structural break models.

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