Herding and loss aversion in stock markets: mediating role of fear of missing out (FOMO) in retail investors

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Abstract

Purpose – The study aims to understand the impact of loss aversion and herding on investment decision of retail investors. The study further evaluates the mediating role of fear of missing out (FOMO) in retail investors on these relationships.

Design/methodology/approach – The study employed questionnaire survey to collect data from retail investors of Indian stock market. Total 323 data were collected. The collected data were examined using SmartPLS. Factor analysis and partial least square structural equation modeling were employed for fulfilling the objectives of the study.

Findings – The results of the study revealed that investment decisions of retail investors are significantly influenced by loss aversion, herd behavior as well as FOMO. Assessing the impact of herd behavior and loss aversion on investment decision in presence and absence of FOMO exposed that FOMO partially mediates these relations. The mediation was complementary in nature as the presence of FOMO increased the influence of loss aversion and herd behavior on retail investor's investment decisions.

Practical implications – Behavioral predispositions are accountable for numerous irregularities in stock markets. Thus, it is quite substantial to realize the stimulus of these partialities on investment decisions. The outcomes of this study would help financial planners and investors to keep in mind the different ways their decision outcomes could be biased and try to ignore them.

Originality/value – Though there have been many studies conducted on behavioral biases and their impact on investment decisions, there are very few studies that have taken into account the FOMO factor in investment, in context of the behavioral biases. Theoretically, FOMO has been linked with herd behavior and greed of earning more, but there are very few empirical supports to this fact. Thus, this study is an attempt to fill this gap by examining the role of FOMO on investment decisions and the different biases associated with it.

Keywords Herd behavior, Loss aversion, Fear of missing out (FOMO), Retail investors

Paper type Research paper

Introduction

Financial decisions are an essential and indispensable chunk of a family's fiscal management practices. Choices relating to same have a great impact on the financial fulfilment, satisfaction and enhancement of quality of life of a family (Sahi *et al.*, 2013). But how an investor settle on their investment choices and decisions is of critical concern, especially the role of investor's partialities and biases that influence their investment decisions (Olsen, 2007; Pompian, 2008). Investors tend to underreact as well as overreact to it, in terms of their returns from investment as well as market anomalies (Fama, 1998). Due to this the topic has always gained the interest of the researchers. There are many studies in the past which have assessed the impact of two important behavioral biases: loss aversion and herd behavior on the investment decision of the investor. However, it has also been observed, in general, that the decision making of the consumers in general is affected by the fear of missing out (FOMO).

Since the investment decisions affect the financial condition of the family, investors are more concerned about possible losses they could incur. Which has been termed as loss

aversion in the prospect theory (Barberis *et al.*, 2003). They tend to sell winning stocks to earn higher profits in fear of prices coming down in future (Dar and Hakeem, 2015). This phenomenon is limited not only to individual stocks but also to investors using mutual funds to invest in equity market, instead of directly investing in stocks, who are also prone to these biases (Bailey *et al.*, 2011). Also, many a times the investor start following what other investors are doing with an intention of not losing out on things called as herding. In herd behavior, investors rely on publicly shared evidence more than private information. Investors base their decision on masses' choices of trading in stocks, against relying on their own rational decisions based on statistics (Caparrelli *et al.*, 2004). Following what the others are doing with an anxiety of being left out or loss on the race is what is being called as FOMO. Hodkinson (2019) and Dogan (2019) explains FOMO as a well-established and embedded concept in consumers that leads them to believe they are missing out on an opportunity or event that others are not.

The decision making of the consumers in general is affected by the FOMO and due to this, they tend to follow the herd behavior (Kang *et al.*, 2019). Some consumers also follow herd behavior for their longing of reducing losses and increasing profits (Puaschunder, 2018). One of the main reasons behind experiencing FOMO is a desire to constantly be connected and on same level as others (Dogan, 2019). According to Denison (2018), FOMO often routes consumers toward irrational decisions. Consumers exhibiting FOMO always try to ensure they are at par with others around them, economically and socially.

Looking at FOMO in finance in a holistic manner, one could identify the reason for a surge in number of retail investors in the market. Hershfield (2020) underpinned FOMO as the major reason behind this surge, even when market movement is uncertain. A frenzied market has been developed, characterized by individuals who are afraid of missing out on potential opportunities by not being invested in the market (Morris, 2019). Prevalence of FOMO in investors leads to a speculative bubble around the market. Evidently, the occurrence of FOMO is not restricted to equities, but it extends to investment in properties, bitcoin, etc., too (Pichet, 2017).

When cryptocurrency was introduced, a similar frenzy was developed in the market where everyone wanted to invest in these virtual currencies. Even though most of the investors did not even understand what cryptocurrency and blockchain technology is, the buzz around the subject was more than enough to develop a FOMO on cryptocurrency's success and persuade them to blindly invest into it. Wherever consumer behavior is involved, chances of individual developing FOMO are certainly high (Denison, 2018). Human beings have a desire to stay connected with others around them. In their mind, they are scared if they do not stay connected to the activities of others around them, they might not have a rewarding experience that their peers or relatives are having (Przybylski *et al.*, 2013). Hence, an investor's financial decisions too are knowingly or unknowingly influenced by their FOMO.

Though, there are studies proving the impact of herd behavior and loss aversion toward the decision making of retail investors (Baker *et al.*, 2019; Sahi *et al.*, 2013; Dar and Hakeem, 2015). But still no study has taken into consideration the impact of FOMO in exhibiting the herd behavior or loss aversion and then over all decision making of the retail investors. The idea that the decisions of the investors can be affected by the FOMO has not yet gained the attention of the researchers. Similarly, to the best of researchers' knowledge, there is a dearth of research, in understanding the role of FOMO in exhibiting the herd behavior and loss aversion by the investors and its effect on investment decision of retail investors.

Based on the above presented notions, the researchers are trying to find answer to some questions through this research. First, are herding effect, loss aversion and FOMO significantly related to retail investor's investment decisions? Second, does the presence of FOMO change the influence of herd behavior and loss aversion on investment decisions? If so,

does FOMO mediate the relationship? Partially (complementary or competitive) or fully? Thus, to find answer the above-mentioned questions and to fulfil the identified research gap, the objectives of the study are: (1) To assess the impact of herding, loss aversion and FOMO on retail investor's investment decisions, and (2) to evaluate whether, FOMO mediates the relationship of herd behavior and loss aversion with retail investor's investment decisions. In the present study, the researcher intents to develop an understanding of the influence of herding effect, FOMO, and loss aversion directly on investment decisions and to examine the influence of herding effect and loss aversion on investment decision in the presence of FOMO as mediator. This would sketch a clear picture of the mediating role of FOMO on these relations.

To meet the objective of the study, the paper is divided into four sections. The first section covers the introduction to behavioral partialities, FOMO, investment decisions and the purpose of the research. The second section encompasses literature review of herding, loss aversion and FOMO along with the hypothesis development for the study. The third section contains the research methodology, data analysis and findings of the study. The fourth section covers the discussion and implications along with the concluding note, limitations and future scope of the present study.

Literature review

There have been numerous theories and models established on these partialities or biases in investment decisions: prospect theory by Kahneman and Tversky (2013) that focuses on the decision taken by investors based on risk prospect, heuristics by Kahneman *et al.* (1982) that leads to investors taking decisions under uncertainty, herding effect that leads to investors depending on another investor's decision more than their own (Dar and Hakeem, 2015) etc. The focus of this study is on loss aversion and herd behavior that influence the retail investor's investment decisions. Loss aversion is a phenomenon in prospect theory, where investors' attention is more avoiding losses than earning a gain, even if the risk is of equal magnitude (Barberis *et al.*, 2003). While herding has been defined as investor's tendency to base their investment decisions on their friends, peers or relative's investment decisions, instead of their own market analysis (Caparrelli *et al.*, 2004).

Conceptual model

The conceptual model considers three major constructs that have a direct or indirect impact on the decision-making process of retail investors. These constructs are loss aversion, herd behavior and FOMO. The studies conducted in the past are discussed below.

Loss aversion and investment decision

Kahneman and Tversky (1979) in their study related investor behavior and decisions to individual's tendency of avoiding decisions that may provide good return but carry some risk. When comparing possible losses and gains from an investment, investors tend to be less positive about the possible gains and are much more afraid of the prospect of losing their principal investment in the process (Banerji *et al.*, 2020). Investors often sell stocks that have attained higher value than their initial investment, as they fear that the prices may go down again and they may suffer a potential loss (Massa and Simonov, 2005; Valaskova *et al.*, 2019). Dar and Hakeem (2015) explained that loss aversion is a phenomenon in which investors are more distraught about potential losses than they are content by advances from investment. Bailey *et al.* (2011) in their study confirmed investor behavior and their decision making to be heavily influenced by dispositions effect or loss aversion, wherein investors tend to sell stocks that have attained higher values and hold on to the ones that have lowered in their

value. This often leads them to making biased investment decisions. Hence, it is hypothesized that

> *H1.* Loss aversion significantly impacts the investment decision of retail investors.

Herd behavior and investment decision

Investors often tend to follow other investors decision, regardless of their own risk bearing capacity or risk tolerance (Waweru *et al.*, 2008). This phenomenon is termed as herd behavior, also known as bandwagon effect, in investors. Investors who are not well-informed feel safe when they mimic the investment pattern of other investors or masses (Dar and Hakeem, 2015). Previous literature has implied that investors do so to appear associated with the individuals around them (Banerji *et al.*, 2020). Herd behavior often results in deviation of security prices from their actual fundamental values toward an unrealistic or nonsustainable valuation (Dewan and Dharni, 2019). Herding has been known to prevail based on the type of investors, like individual retail investors tend to exhibit herd behavior more than institutional investors do (Goodfellow *et al.*, 2009). Varied investor behavior has been observed across different nations under the influence of herd behavior (Shukla *et al.*, 2020). Investors have been known to follow herd behavior in both bearish as well as bullish market conditions (Poshkwale and Mandal, 2014; Filip *et al.*, 2015). Poshakwale and Mandal (2014) also identified that though prevalent in both bearish and bullish market, the impact of herding effect is more dominant in a bearish market. There are multiple theories postulated by researchers linking herd behavior to trade volumes (Chauhan *et al.*, 2019), prevalence of a crisis (Garg and Gulati, 2013), geographical demographics (Ripoldi, 2016; Indars *et al.*, 2019), age of investor (Choi, 2016) etc. Thus, in this study researchers hypothesize that:

> *H2.* Herd behavior significantly affects the decision making of retail investors.

FOMO and investment decision

FOMO prevails in individual when they see, read or learn about others' actions and feel like they're missing out on it (Abel *et al.*, 2016). FOMO has also been studied in the context of consumer behavior and how it influences consumers' decision making process (Kang *et al.*, 2020). Same can be said about investors who under the influence of desire to earn higher profits and feel they may miss out on potential opportunities if they do not take immediate actions (Dennison, 2018; Kang *et al.*, 2020). These actions may be biased as investors tend to ignore facts when acting out of this fear. Shiva *et al.* (2020) in their study investigated the relation between investor FOMO and investment decision of retail investors and found a string relationship between the two. Consider a group of investors who have a common tendency toward one particular industry in the market. The said industry has been surging in the past. Now, these investors would develop a FOMO on potential gain when they've seen others thriving by investing in the industry (Hershfield, 2020). This investment FOMO then starts driving their investment decisions. Hence, it is hypothesized that:

> *H3.* Fear of missing out significantly affects the decision making of retail investors.

Mediating role of FOMO

Studies of past conducted in the context of behavioral finance and investment decision provide evidence that there are several variables that have been proven to mediate the relationships between the two. Several authors have studied the mediating role of risk and different attributes of risk that mediates these relations (Sitkin and Weingart, 1995; Riaz *et al.*, 2012; Khan, 2014; Hunjra and Rehman, 2016; Saurabh and Nandan, 2018; Raheja and Dhiman, 2019; Sadiq and Khan, 2019). Falahati *et al.* (2012) in their study analyzed the mediating role of

financial behavior and financial strain. Lakey *et al.* (2008) studied judgement and decision making while Ali (2011) and Jamal *et al.* (2015) studied the role of attitude on the relation between behavioral biases and investment decisions. Some authors even pursued financial literacy and financial self-efficacy as mediator variables (Akhtar and Das, 2019; Ameliawati and Setiyani, 2018). Thus, with a similar theory in mind, FOMO has been taken up as a mediating variable in the current study. Researchers in the past have not studied the mediating role of FOMO on the relationship between biases and investment decisions. Thus, the findings of the present research would be quite beneficial in explaining the subject matter.

Researchers in past have identified a connection between FOMO and investors exerting herd behavior and aversion in the form of greed. Denison (2018) in his study established FOMO as a significant influencer that leads investors make hasty investment decisions to ensure that they are able to keep up with their colleagues and neighbors. He also pointed out that these investors are highly driven by their desire to earn more returns quickly and thus avoid any future loss. Kang *et al.* (2020) and Tarjanne (2020) supported the relation between FOMO and herd behavior. They implied that the FOMO leads consumers to collective consumption of products to spring psychological comfort within. An individual's collective consumption decision is often influenced by others around him or her. And it is not hard to believe that these investment decisions are based on their friends' or relatives' advice as the chances of a conflict of interest arising in this advice are much lower when compared to other sources (Kuchler and Stroebel, 2021). Individuals are thus driven in their investment by a FOMO when they see their friends and peers succeeding in stock market. Spread of FOMO leads to herd behavior, and this continuously drives the prices of securities (Hershfield, 2020).

Thus, the hypotheses developed from these literature are:

H4. Loss aversion has a significant impact on fear of missing out in retail investors.

H5. Herd behavior has a significant impact on fear of missing out in retail investors.

H6. Fear of missing out in retail investors mediates the relationship between loss aversion and investment decision.

H7. Fear of missing out in retail investors mediates the relationship between herd behavior and investment decision.

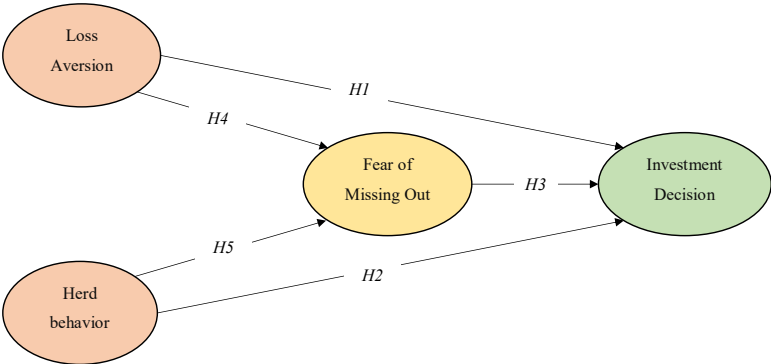Figure 1 below depicts the research model adopted for the study.

Figure 1.
Research model

Research methodology

The responses were recorded using a seven-point Likert scale where 1 stood for very strongly disagree and 7 stood for very strongly agree. The data from respondents were collected via mail survey or through personal interviews. The items generated for the questionnaire that was done through extensive literature review are shown in Table 1. The items in the questionnaire were divided into two sections. The items measuring and recording the demographics details of the respondents were incorporated in the first part of questionnaire while the items measuring the latent constructs were incorporated in the second part of the questionnaire.

The target population for this study were retail investors who preferred investing in equity stocks securities in Indian stock market. In a study conducted by Securities Exchange Board of India (SEBI), it has been identified that more than 50% of the investors in India are from West region. This includes the state of Gujarat, Maharashtra, Madhya Pradesh and Chhattisgarh, which is the center of this study. The investors from this region, generally preferred investment in equity and mutual funds, as compared to other avenues of investment such as debentures, derivative or futures (SEBI, 2015). It has been empirically identified in the same study that 33% of the total investors preferred investment in equity.

In this study, the top brokerage firms operating in Chhattisgarh were identified through Chittorgarh Infotech's website (https://www.chittorgarh.com/). The website has the top brokerage firms listed according to their client base. From these, the top 5 brokerage firms with maximum market share were acknowledged and their offices operating in Chhattisgarh were known. The next step was to contact these offices/branches and seek out their assistance with respect to their clientele. The brokerage firms were clearly explained about the purpose of the research, and it was ensured that no confidential details of their client were transferred. Only basic details like name, email and contact number were provided. It was ensured that this information would not be used for any commercial purpose or for any kind of monetary gain. In case a brokerage firm was not interested in sharing the required information, the next entity in the list was contacted with the same agenda. The study was limited to Chhattisgarh as brokerage firms outside Chhattisgarh were not ready to share their client information.

Nonprobability purposive sampling was employed for selecting the respondents who were based in Chhattisgarh, India. Purposive sampling was employed as it helped provide precise and consistent results for the study (Denzin and Lincoln, 2005). Studies conducted by Shiva et al. (2020), Ali (2011), Hunjra and Rehman (2016), Akhtar and Das (2019), Raheja and Dhiman (2019) and Baker et al., (2019) built around similar context to the current research, adopted purposive sampling. In the current research, researcher also used GPower 3.1 software to determine adequate sample size. By using correct effect size and the test technique, GPower has been proven to produce almost error free calculation with reference to sample size measurement (Erdfelder et al., 1996). Thus, the same was used for sample size measurement in the current research as well. There were four latent constructs in the research

Factors	References
Loss aversion	Chen et al. (2007), Montier (2010), Dar and Hakeem (2015), Banerji et al. (2020), Tarjanne (2020)
Herd behavior	Dar and Hakeem (2015), Chauhan et al. (2019), Banerji et al. (2020), Shukla et al. (2020), Tarjanne (2020)
FOMO	Dennison (2018), Kang et al. (2020), Shiva et al. (2020), Tarjanne (2020)
Investment decision	Dar and Hakeem (2015), Banerji et al. (2020), Shiva et al. (2020), Shukla et al. (2020)

Note(s): Literature studied for generating items/variables for the current study

model, and a minimum effect size (f^2) of 0.05 at a statistical power of 95% was set as the criteria for sample size determination. As per the results of GPower 3.1, total 262 respondents were deemed to be adequate for the study (Erdfelder *et al.*, 1996; Faul *et al.*, 2007, 2009). The data collection process continued into three phases. In the first phase of survey, 500 individuals from the selected list of respondents were emailed the questionnaire. As expected from mail survey, the response rate was low and a total of 119 responses were received. All the items listed in questionnaire had to be mandatorily answered for submitting their response. This also helped ensure that no submission came back with missing response to items. Once the data were received from first phase it was analyzed for its reliability. Responses with zero variation were analyzed, and it was realized that respondents in the said data had agreed to all the items of the questionnaire. Such responses were eliminated from the response set to avoid acquiescence bias. Acquiescence bias is a phenomenon quite common with survey methods where respondents have been known to agree to all the items in the questionnaire.

Based on the abovementioned analysis, 27 responses were eliminated from the dataset as they had no variation in their response pattern. This left researcher with a total of 92 responses from the first phase of data collection. Looking at the response rate, the next phase of data collection Phase 2 was planned with a larger size of respondents to ensure a higher number of responses back from the sample. As expected, reaching out to a larger demographic paid back with a comparatively larger response set from Phase 1. In Phase 2 of data collection, out of the 800 respondents emailed, 240 were filled. These were again checked for acquiescence bias and after eliminating responses with zero variation, 209 responses were retained.

Combining the data from Phase 1 and Phase 2, researcher had a total of 301 useable responses for the study. In a final attempt to move the response count a little further than 301, researcher started calling individuals randomly from the list of investors. In the third and final phase of data collection, 22 useable and complete responses were collected bringing the total up to 323 out of total 359 responses received throughout the data collection process. About 323 seemed as an adequate sample size as the measured sample size was estimated between 300 and 350. The data attained were then analyzed using Smart PLS 3.3.2 software.

Data analysis
The demographic profile of the respondents is mentioned in Table 2.

Demographic variable	Category	Frequency	Percentage (%)
Age	26–35	84	26
	36–45	100	31
	46–55	94	29
	Above 55	45	14
Gender	Male	149	46
	Female	174	54
Annual income	≤250,000	71	22
	250,001–500,000	113	35
	500,001–750,000	81	25
	>750,000	58	18
Percentage of income invested in securities	<10%	109	34
	10–30%	128	39
	>30%	86	27

Note(s): Demographic distribution of the respondents of current research
Source(s): Authors' calculation

Table 2.
Respondents' profile

Out of the 323 respondents, 46% were male, and 54% were female investors. Thirty-one percent of the respondents were from 36–45 age groups, while 26%, 29% and 14% were from 26–35, 46–55 and above 55 age groups. About 22% of the responded had an annual income of less than ₹250,000, whereas 35% to the income group of ₹250,001 to 500,000. Remaining 22% and 18% respondent earned between Rs 500,001–750,000 and more than Rs. 7,50,000 per annum, respectively. Fifty-six percent respondents had a low-risk appetite while forty-four percent believed that they are ready to take high risk in order to achieve a higher return from their investment. About 34% respondent invested less than 10% of their income in Securities, 39% invested 10%–30% of their income, whereas only 27% invested more than 30% of their income in the securities.

Common method variance
One of the most important aspect of behavioral or psychological study using PLS-SEM is the prevalence of common method bias (Conway and Lance, 2010). Common method bias often results from using a biased instrument, and it is a must for behavioral studies to ensure no common method bias in the study (Kock, 2015). Hence, in this study the common method bias is assessed using Harman's one factor test. The test suggests that all the items from the measurement instrument, i.e. questionnaire used, when loaded into a single factor should not account for more than 50% variance (Podsakoff and Organ, 1986; Wei *et al.*, 2011). Testing the data collected, using unrotated principal component analysis, it is revealed that all the items put together into a single factor explained 45.309% variance. Hence, it is confirmed that no critical or serious risk of common method bias is present as the total variance explained by a single factor was less than 50%.

Measurement model assessment
Figure 2 depicts the measurement model of the study. There are four latent constructs in the model, namely loss aversion, herd behavior, FOMO on investment and profit earning opportunities, and investment decisions. In the first step of data analysis, the reliability and validity of exogenous variables in the outer model are assessed using SmartPLS 3.3.2 and two-stage systematic procedure (Anderson and Gerbing, 1988; Ringle *et al.*, 2015). A composite reliability (CR) value of more than 0.7 is an indicator of good reliability while an average variance extracted (AVE) value of more than 0.5 indicates satisfactory convergent
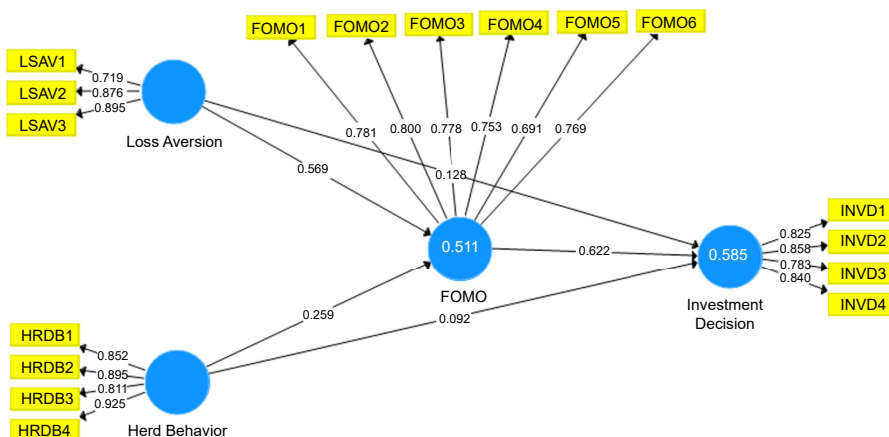

Figure 2.
Measurement model

validity (Hair *et al.*, 2016, 2017). Another measure of reliability is Cronbach's alpha value according to which, an alpha coefficient of 0.7 or above indicated good reliability of constructs (Cronbach, 1951). Measurement model assessment results depicted in Table 3, reveal good CR and convergent validity in the model. CR, Cronbach's alpha and rho_A values of all constructs are more than 0.7, and AVE values are more than 0.5 for each construct. Hence, it is concluded that the measurement model has good reliability and validity.

Post assessing CR and convergent validity of the constructs, their discriminant validity is assessed. For this, there are two methods, first suggested by Fornell and Larcker (1981) and second HTMT criterion by Henseler *et al.* (2015). Past literature implies that HTMT criteria for measuring discriminant validity is better than Fornell–Larcker criterion, as it accounts for better sensitivity and specificity rate (Xia and Chengb, 2017; Rasoolimanesh *et al.*, 2019). According to Fornell and Larcker (1981), discriminant validity is achieved when the square root of a factor's AVE is more than its correlation coefficients with other variables. For HTMT criteria, calculated value less than 0.9 indicates satisfactory discriminant validity (Gold *et al.*, 2001; Henseler *et al.*, 2015; Voorhees *et al.*, 2016). Results reported in Tables 4 and 5 indicate good discriminant validity. Finally, the model fit is also assessed using Standardized Root Mean Square Residual (SRMR) where a value of less than 0.08 establishes acceptable model fit (Hair *et al.*, 2016). For the measurement model in this study, calculated SRMR is equal to 0.069, less than 0.08, thus model fit is deemed acceptable (Hu and Bentler, 1999).

Construct	Items	Loading/Weight	CR	Cronbach's alpha	rho A	AVE
Loss aversion (LSAV)	LSAV1	0.719	0.871	0.779	0.812	0.695
	LSAV2	0.876				
	LSAV3	0.895				
Herd behavior (HRDB)	HRDB1	0.852	0.927	0.894	0.903	0.760
	HRDB2	0.895				
	HRDB3	0.811				
	HRDB4	0.925				
FOMO	FOMO1	0.781	0.893	0.856	0.856	0.582
	FOMO2	0.800				
	FOMO3	0.778				
	FOMO4	0.753				
	FOMO5	0.691				
	FOMO6	0.769				
Investment decision (INVD)	INVD1	0.825	0.896	0.846	0.847	0.684
	INVD2	0.858				
	INVD3	0.783				
	INVD4	0.840				

Table 3.
Measurement model assessment results

Note(s): Item loadings/weights and reliability results for the measurement model
Source(s): Authors' calculation

	FOMO	HRDB	INVD	LSAV
FOMO	0.763			
HRDB	0.490	0.872		
INVD	0.753	0.448	0.827	
LSAV	0.674	0.405	0.584	0.834

Table 4.
Discriminant validity assessment results (Fornell–Larcker criterion)

Source(s): Authors' calculation

Structural model assessment
In structural model assessment, the first step is to check for multicollinearity issues. According to Diamantopoulos and Siguaw (2006), the primary reason for existence of multicollinearity issues in any model is high intercorrelation amongst variables. Evaluating variance inflation factor (VIF) is standard methodology to assess multicollinearity issues in a model. According to Diamantopoulos and Siguaw (2006), VIF values of less than 3.33 indicates no multicollinearity issues in the model. Hair *et al.* (2017) suggested that VIF values less than 5 is a satisfactory indicator of absence of multicollinearity issues in model. Looking at the VIF results shown in Table 6, VIF values of all the constructs is in the range of 1.196–2.043, confirming no multicollinearity issues in the inner model.

Next step is to test the hypotheses of the study. Figure 3 depicts the structural model of the current research. Using SmartPLS, the hypotheses are tested using bootstrapping technique. Bootstrapping, a resampling procedure, is run with a subsample size of 5,000 as large sample size ensures lower variance between original values and mean values of regression path coefficients. Bootstrapping also helps ensure stability of estimates (Davcik, 2014). As per the hypotheses of the study, loss aversion and herd behavior are related to both FOMO and investment decision. It is also hypothesized that FOMO has an impact on investment decisions of retail investors. As per the research model, loss aversion and herd behavior influenced investment decision via FOMO, hence role of FOMO as a mediating variable in loss aversion and herd behavior's relationship with investment decision is also assessed. Bootstrapping results depicted in Table 7 infer that loss aversion and herd behavior have a positive and significant impact on FOMO in investors and investment decisions. Loss aversion influences both investment decision and FOMO significantly (depicted in Table 7) thus supporting hypotheses H1 and H4. Herd behavior has a small but significant influence on investment decision and a significant influence on FOMO supporting H2 and H5. FOMO has a quite significant impact on investment decisions hence supporting H3.

Results report a high *t*-value in the impact that loss aversion has on FOMO and FOMO has on investment decision. This further strengthens the hypothesis of the study depicting a strong influence of FOMO on investment decisions and loss aversion inducing FOMO in retail investors. Once could also infer that the presence of FOMO in an investor makes them highly susceptible to loss aversion while making their investment decisions. The direct effect of FOMO on retail investor's investment decision is quite high compared to loss aversion and

	FOMO	HRDB	INVD	LSAV
FOMO				
HRDB	0.553			
INVD	0.877	0.506		
LSAV	0.813	0.473	0.710	
Source(s): Authors' calculation				

Table 5.
Discriminant validity
assessment results
(HTMT criterion)

	FOMO	Herd behavior	Investment decision	Loss aversion
FOMO			2.043	
Herd behavior	1.196		1.333	
Investment decision				
Loss aversion	1.196		1.858	
Source(s): Authors' calculation				

Table 6.
Variance inflation
factor values

Figure 3.
Structural model of
the study

	Relationship	Std. β	t-value	Confidence interval	Effect size (f^2)	Supported
H1	Loss aversion → investment decision	0.128	2.265	0.017, 0.239	0.021	Yes
H2	Herd behavior → investment decision	0.092	2.109	0.003, 0.175	0.015	Yes
H3	FOMO → investment decision	0.622	13.124	0.527, 0.710	0.456	Yes
H4	Loss aversion → FOMO	0.569	15.666	0.495, 0.637	0.553	Yes
H5	Herd behavior → FOMO	0.259	5.496	0.163, 0.348	0.115	Yes
H6	Loss aversion → FOMO → investment decision	0.354	9.774	0.101, 0.225	-	Yes
H7	Herd behavior → FOMO → investment decision	0.161	5.152	0.287, 0.428	-	Yes

Note(s): Results of hypothesis testing via Bootstrapping technique, conducted through SmartPLS
Source(s): Authors' calculation

Table 7.
Hypothesis testing
results obtained by
bootstrapping

herd behavior. The coefficient of determination R^2 and adjusted R^2 values of investment decision are 0.585 and 0.581, respectively. This infers good predictive precision of the predictor variables in explaining investment decisions (Cohen, 1988). The impact of loss aversion and herd behavior on investment decision through FOMO was significant. Same is depicted in Tables 7 and 8. This reveals that in the presence of FOMO (H6 and H7), both loss aversion and herd behavior are influencing investment decision more significantly in comparison to absence of FOMO (H1 and H2). These results support the hypotheses H6 and H7, i.e. FOMO mediates the relations between loss aversion, herd behavior and investment decision. This also indicates that FOMO plays complementary mediator role in the relationships as the direction of predictor biases and mediating variables is same toward investment decision (Zhou *et al.*, 2007).

Cohen (1988) came up with process of measuring the effect size (f^2) of the constructs establishing that f^2 value of more than 0.35 implied massive effect, 0.15–0.35 inferred moderate effect and less than 0.15 inferred little effect. Loss aversion ($f^2 = 0.021$) and herd behavior ($f^2 = 0.015$) have little effect while FOMO ($f^2 = 0.456$) has high effect on investment decisions. Model fit of structural model is acceptable as the standard root means square

residual value (SRMR) of the model is 0.069 which is lower than 0.08, recommended maximum threshold value (Hu and Bentler, 1999). Predictive relevance, i.e. Stone–Geisser's Q^2 value (Geisser, 1974; Stone, 1974) of the model is assessed using blindfolding technique, with an omission distance of eight. The Q^2 value is 0.388 establishing satisfactory predictive relevance of the model.

Implications and discussion

The study attempts to analyze the influence of loss aversion, herd behavior and FOMO on retail investor's investment decisions. Despite the availability of several research on behavioral biases and their effect on investment decisions, this study takes it a step further and analyses the mediating role of FOMO on the relationship of loss aversion and herd behavior with retail investor's investment decision. Results reveal that retail investor's investment decisions are significantly influenced by all three variables. Findings of this study are in line with previous studies on same subject (Caparrelli *et al.*, 2004; Sahi *et al.*, 2013; Dennison, 2018; Raheja and Dhiman, 2019; Shiva *et al.*, 2020; Shukla *et al.*, 2020). Out of the three predictors, FOMO has the most impact on investment decisions of retail investors, followed by loss aversion and herd behavior. As per the results, herd behavior only has a minor impact on their investment decisions. The results also reveal that FOMO plays a complementary mediating role in the loss aversion and herd behavior's relationship with retail investor's investment decision.

The major focus of this study is the mediating role of FOMO on relationship of loss aversion and herd behavior with investment decisions. Researchers across different countries and markets have been studying FOMO in different contexts like consumer behavior, decision making, social anxiety, marketing appeals etc. The study is an attempt to check the impact of FOMO in the field of behavioral finance. The results of the study show that loss aversion and herd behavior are significant even in absence of FOMO in retail investors. But in the presence of FOMO, the influence of loss aversion and herd behavior on investment decision has been amplified significantly. Out of the total effect herd behavior and loss aversion have on investment decision, 64% and 73% of the variance respectively have been accounted for in the presence of FOMO. This implies that retail investors may normally exhibit a certain degree of loss aversion or herding in their investment decisions, but if they are prone to FOMO, their investment decisions would be biased by loss aversion and herd behavior even more. Since the direction of influence of aversion and herding on investment decision are same in absence as well as presence of FOMO, the mediation has been categorized as complementary mediation. The mediation is partial in nature, since the variance accounted for (VAF) values are between 20 and 80% (Zhou *et al.*, 2007).

The study adds to the standing body of literature available on behavioral biases and their effect on investment decision, with added value of the influence of FOMO on these relations. Behavioral finance has been a topic of interest for researchers on a global level for quite some

Predecessor construct (a)	Direct effect on investment decision (b)	Indirect effect on investment decisions (c)	Total effect on investment decision (d)	Variance accounted for (c/d)	Mediation by FOMO
Loss aversion	0.128	0.354	0.482	0.73	Complementary mediation
Herd behavior	0.092	0.161	0.253	0.64	Complementary mediation
FOMO	0.622	–	0.622	–	–
Source(s): Authors' calculation					

Table 8.
Direct, indirect and total effects of independent variables on dependent variable

time now and even in modern times, it is considered as an important subject of study. These biases often cause anomalies in the market as the retail investors are more focused on collective or just a handful of information and ignore actual facts that should be considered in their investment decision making process (Wood and Zaichkowsky, 2004). Hence, a clear picture of these biases with their behavior in presence of FOMO fills the gap identified from the past literature. The results of the study contributing to the subject would be of great value.

The practical implications from these findings could be drawn by retail investors and financial analysts across the globe, who trade in security markets. Retail investors while choosing their investment avenues should always keep in mind the influence herd behavior, loss aversion and FOMO could have on their investment decisions. As evident by past studies conducted in the same subject areas as this study, these biases and their influence are not limited to a particular country or a single market. These biases have a global presence and hence retail investors should place a check on these to ensure their investment decision are free from these biases. This would help ensure absence of any error in judgement and achieve optimum return on investment. And consequently, this would develop a sense of financial satisfaction within them. Financial analysts should take a note of these biases and how they can impact retail investors as these cause irregularities in security markets. They should check for recent market trends and avoid investing in stocks that have recently fluctuated in value as it might be a consequence of investment decision solely based on collective information or statistically unconfirmed facts.

Conclusion
The study confirms the significant influence of loss aversion, herding effect and FOMO in investors on retail investor's investment decision. The study also assesses the mediating role of FOMO on loss aversion and herd behavior's relationship with investment decision. It was observed that the presence of FOMO significantly increases the effect of loss aversion and herd behavior on investment decisions. The implications and findings of the study could help retail investors and financial planners keep a check on these biases and avoid error of judgement during their decision making process.

Limitations and scope for future research
This study is bound by some limitations. First, the study considered herd behavior and loss aversion only. Future researchers can consider other heuristic and prospect biases and assess how they influence investment decision in presence of FOMO. Second, a moderating variable like gender, income, etc., could be introduced in the model to check if there is a possibility of moderated mediation. Lastly, the respondents who participated in this study are all based at Chhattisgarh. The brokerage firms that agreed to participate in the current research are all based in Chhattisgarh and hence had clientele based in Chhattisgarh as well. Given that the target populations details necessary for data collection, like investor's name, email, contact number, etc., had to be extracted from brokerage firms, it was difficult to extract these from firms situated outside Chhattisgarh due to limited reach. A sample covering a different geographical area could also be studied using the same model to identify the behavioral biases for that particular region. Similar results from other demographics could confirm the generalization of this study's results and findings.

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Further reading

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Appendix
Questionnaire items

Loss aversion

(1) Your prior loss experience highly affects your risk-taking ability.

(2) You usually have the tendency to avoid selling shares that have attained a lower value.

(3) You usually sell shares that have attained higher values.

Herd behavior

(1) You prefer to invest in stocks in which your peers and relatives have invested.

(2) You analyze the company's customer preference before you invest in their stocks.

(3) You follow the market movements while buying or selling stocks.

(4) Other investors' recommendation of investment affects your stock purchases.

FOMO

(1) It bothers you when you do not hear news about your investments.

(2) You get anxious when you do not know what the companies, you're investing in are planning.

(3) You would like to be immediately updated about the trends in stocks you've invested in.

(4) You get worried when you are not able to check in on your portfolio.

(5) It bothers you if you miss out on investment opportunities.

(6) You fear being the last to know about news that is relevant to your portfolio.

Investor decision

(1) You feel satisfied with your investment decisions in stock market.

(2) Your recent stock investment has met your rate of return expectation.

(3) Your investment has lower risk compared to the market in general.

(4) Your normal rate of return is higher than the average rate of return of the stock market.

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