Stock market drivers of retail investors' sentiment – facets and new evidences from India

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Abstract

Purpose – The determinants of investors' sentiment based on secondary stock market proxies in many empirical studies are reported. However, to the best of our knowledge, no study undertakes investor sentiment drivers developed from primary survey measures by constructing an investor sentiment index (ISI) in relation to market drivers to date. This study aims to fill this research gap by first developing the ISI for the Indian retail investors and then examining which of the stock market drivers impacts such sentiment.

Design/methodology/approach – The ISI is constructed using the mean scores of eight statements as formulated based on popular direct investor sentiment surveys undertaken across the world. Then, we use the multiple regression approach overall and for top 33.33% (high-sentiment) and bottom 33.33% (low-sentiment) investors based on the responses of 576 respondents on 18 statements (proxying eight study hypotheses) collected in 2016. Moreover, the demography-based classification based investors' sentiment is examined to make our results more robust and in-depth.

Findings – On an overall basis, the IPO activities/issues and information certainty, trading volume and momentum and institutional investors' investment activities market drivers significantly and positively impact retail investors is examined. However, only IPO activities/issues and information certainty influences both high- and low-sentiment investors. It is intriguing to report that nature of the stock markets show conflicting results for high- (negative significant) and low- (positive significant) sentiment investors.

Originality/value – The construction of the ISI from primary survey measure is for the first time in Indian context in relation to investigating the stock market drivers influential to retail investors' sentiment. In addition, hypothesized market drivers are also unique, each representing different fundamental and technical characteristics associated with the Indian market.

Keywords Investor sentiment index, Investors' sentiment, Stock market drivers, Multiple regression model

Paper type Research paper

1. Introduction

The empirical literature has extensively examined retail investor sentiment across disciplines, contexts and countries. There are three most critical issues to be researched on these lines:

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- who are 'retail' investors and what is 'investor sentiment'?
- How to measure 'investor sentiment'?
- what factors drive such 'investor sentiment'?

In this study, we attempted to formulate and investigate our hypotheses to answer above questions in the Indian context. To our knowledge, this kind of study has not undertaken before from a stock market drivers' context.

Generally, a retail investor is a "small individual investor who commits capital from hihe/sher personal account rather than on behalf of another company" (DasGupta and Singh, 2019). In India, SEBI (Securities and Exchange Board of India) (SEBI, 2016) defines "*retail investor as one whose total investment in equity market is not more than Rs.2 lakhs in a year*". Accordingly, we hereby define a retail investor as "an investor who commits investible amount of up to Rs.2 lakhs p.a. from his/her personal account for at least last three years continually".

Moreover, it is extremely crucial how to define 'investor sentiment' in specific study contexts like this study. We obtained motivation from three specific definitions to define our 'investor sentiment' here. Firstly, Shleifer (2000) defined 'investor sentiment' as "heuristic behavior based belief or rules of thumb rather than Bayesian rationality in making own investment decisions". Lee *et al.* (1991) defined 'investor sentiment' towards markets as – "part of their expectations about the returns of assets which are not justified by economic fundamentals." Finally, Zhang (2008) defined it as – "any erroneous beliefs that individuals have about an economic variable, such as asset prices." Accordingly, we define it as 'investor sentiment' is the heuristic behavior based erroneous belief about an economic variable, i.e. stock market prices; based on individual expectations from nature, investments and returns and market technical of the stock market; backed by demographics, in addition to the use of intellect for information processing (i.e. Bayesian updating).

The second critical issue is how to quantitatively measure investor sentiment. Empirical literature in behavioral finance provides us two measures of '*investor sentiment*' - a direct survey-based measure (Brown and Cliff, 2005) and an indirect measure constructed using implicit market sentiment proxies (Baker and Wurgler, 2006). However, there is no consensus about which of these sentiment measures is more accurate and efficient. Accordingly, there is the requirement to develop a theoretically sound and empirically tested direct primary survey-based measure to quantify retail investors' sentiment. We attempted to develop such an *investor sentiment index* (ISI) from primary survey data for the Indian retail investors [1]. This is one of our primary motivations to test this *index* in regard to how market drivers impact it.

The third and most important issue to be investigated here is which market factors or drivers impact retail investors' sentiment. Eastlick (1996) earlier observes that many stock market investments might involve several participants who play the role of an initiator, influencer, buyer and user, similar to the buying behavior. Accordingly, the investment decision-maker goes through a decision making process comprising problem recognition; information search; evaluation of alternative purchase decision and post-purchase behaviors. This indicates that all types of investors (including retail ones) in stock markets (directly or indirectly) go through a decision-making process that is usually influenced by a number of internal (investors'-specific [proxies by demographic characteristics here]) and external (stock market-specific, macroeconomic, policy-specific, influence-specific and others etc.) factors or drivers. Thus, our secondary motivation here is to find that stock market-specific drivers have significant influence on Indian retail investors' sentiment.

We contribute to the existing literature in three ways. First, we attempt for the first time in an emerging market context to develop an investor sentiment index (ISI) by a direct survey approach based on internationally validated survey questions in regard to stock market drivers as hypothesized here. Study results will generalize in-depth market-specific factors in influencing Indian retail investors' investment decisions in the stock market, which can further be used in other emerging market contexts. Secondly, we confirm that in Indian context *IPO activities/issues and information certainty, trading volume and momentum* and *institutional investors' investment activities*, on an overall basis, only positively drive retail investors' sentiment. However, it is intriguing to report that *nature of the stock markets* show a conflicting result with a negative bias. Demography-based classifications provide multiple interesting results. Lastly, earlier studies (Baker and Wurgler, 2006; Chen *et al.*, 2010) use the principal components analysis to construct the *investor sentiment index* from secondary data mostly for the USA. However, our study uses primary data for the first time to construct the ISI and then use multiple regression methodology to investigate the stock market drivers' impact on investors' sentiment in an emerging market context, i.e. India.

We organize the remaining portion of our paper as follows. Section 2 talks about the literature review and hypotheses developed, Section 3 shows data and detailed methodology, Section 4 shows the empirical results followed by discussions and Section 5 shows the conclusion, followed by references.

2. Literature review and hypotheses developed

2.1 Stock market factors and retail investors' sentiment

One of the basic propositions that attracts market investors and specifically retail ones is the nature and trends in the stock market at present and in near future. Empirical research perceives that correlation between a financial asset with stock/index returns increases in market downturns, i.e. during bear market conditions (Connolly *et al.*, 2007; Longin and Solnik, 2001). The argument augurs well for an increased herding behavior because of low investors' sentiment (Barberis *et al.*, 2005; and Kumar and Lee, 2006). Connolly *et al.* (2007) and Longin and Solnik (2001) report that correlations between international equity markets increase in bear markets. Odean (1998) observes that retail investors are more likely to experience investment success in bull markets because of their attribution bias, which would further augment their sentiment to invest. The normal volatility in stock returns might influence retail investors' sentiment in shaping their emotional perception about a particular company or the market (Rehman, 2013). Accordingly, the *first hypothesis* of our study is as follows:

H1. Nature of the stock market (NSM) drives retail investors' sentiment to invest in the Indian stock market

One of the most critical considerations for Indian retail investors in relation to the stock market is the daily stock returns (Glaser *et al.*, 2009) and/or predictability of future returns because of a stock's/market's over-pricing or under-pricing (Baker and Wurgler, 2006; and Qiu and Welch, 2006). Empirical literature thereby supports a positive (negative) relationship between investors' sentiment and contemporaneous (expected) stock returns because of overpricing (underpricing) in stock prices (Baker *et al.*, 2012; Dash and Mahakud, 2012). Moreover, such results indicate that the higher the retail investors' sentiment is, the smaller will be the future market returns and thereby it implies a higher possibility of negative market returns in the future. Accordingly, the *second hypothesis* of our study is as follows:

H2. Index and/or stock returns (I&SR) with appropriate pricing drive retail investors' sentiment to invest in the Indian stock market.

Another critical consideration in relation to stock markets is the regulatory environment that safeguards investors' money and thereby drives retail investors' sentiment to invest (Al-Tamimi, 2005; Elton *et al.*, 1998; Rashid and Nishat, 2009). Empirical results suggest the importance of effective regulation and mandatory disclosure requirements to ensure supply of quality information to all investors, investors' education and technology-driven trading in brokerage houses for overall investor satisfaction and protection of their interests. It is usually believed that the less developed countries such as India are weak form efficient only because of lack of access to information by retail investors, inadequate regulations, lack of supervision and non-availability of data in simple and usable form (Mobarek and Keasey, 2000). The recent Securities and Exchange Board of India [SEBI] regulations [Listing Obligations and Disclosure Requirement (Amendment) Regulations 2018] further augmented the investing activities and sentiment especially by the foreign institutional investors (FIIs). This has made the Indian stock market more regulated and stable. However, the SEBI and the Government have additional responsibilities of educating capital market participants specifically retail investors in regard to their rights and duties for strengthening the functioning of Indian market (Deene *et al.*, 2011). Accordingly, the *third hypothesis* of our study is as follows:

H3. Investors' friendly market environment (IFME) drives retail investors' sentiment to invest in the Indian stock market.

In addition to the secondary market activities, IPO activities/issues is associated with market tops and is considered as a measure of sentiment because of information asymmetries between firm managers and investors (Ibbotson and Ritter, 1995). The IPO market is observed to be sentiment-sensitive with high first day returns representing investors' enthusiasm (Loughran *et al.*, 1994). Mahjoub (2010) report that investors' sentiment is a primary driver of under-pricing, and individual retail investors are those driving the first day closing prices and are more conducive to the short-run IPO puzzle than the institutional investors. Accordingly, Baker and Wurgler (2007) suggest that IPO volume could be used as a sentiment proxy. They claim that the underlying demand for IPO issues is perceived to be extremely sensitive to the prevailing investors' sentiment in the stock market. In this regard, Jiang *et al.* (2005) and Zhang (2006) suggest that the retail investors' overreaction are more prominent under conditions of information uncertainty because these investors become more overconfident for firms that are hard to value. Hirshleifer (2001) earlier posit that psychological biases are increased when there is more uncertainty. Accordingly, the *fourth hypothesis* of our study is as follows:

H4. IPO activities/issues and information certainty (IPO&IC) drives retail investors' sentiment to invest in the Indian stock market.

In addition to the market fundamentals, retail investors place strong emphasis on market trading information and technical factors.

Wang (2001) use trading volume because it is recognized by economists as an important factor indicating investors' interest. Baker and Stein (2004) further argue that market liquidity as measured by trading volume could be an indicator of investors' sentiment. This is because increase in trading volume reflects the participation of overconfident investors in the market and indicates an improvement in investors' sentiment. In addition to trading volume, momentum in price-volume actions is considered as an indicator of investors'

sentiment. Empirical studies report that such momentum is stronger in small than in large firms (Moskowitz and Grinblatt, 1999); in growth than in value firms (Daniel and Titman, 1999) and in firms with low rather than high analyst following (Hong *et al.*, 2000). However, recently certain researchers have highlighted that stocks of big firm are subject to investors' sentiment risk because of their popularity that make them always in the spotlight of investors' attention (Akhtar *et al.*, 2012). However, Chui *et al.* (2010) report that momentum profits are positively related to analyst forecast dispersion, transaction costs and the familiarity of the market to foreigners, and negatively related to firm size and volatility. Accordingly, the *fifth hypothesis* of our study is as follows:

H5. Trading volume and momentum (TV&M) drive retail investors' sentiment to invest in the Indian stock market.

Chakrabarti (2001) observes that FIIs net inflows in Indian market are correlated with index returns and such inflows are more likely to be the effect rather than the cause of market returns. Mukherjee *et al.* (2002) while reiterating Chakrabarti's (2001) observations, which emphasize that while FIIs sales and FIIs net inflows are significantly affected by the performance of the Indian equity market and FIIs purchases are not responsive to this market performance. In a recent study, Dash and Mahakud (2012) find that because of a herding nature (Barberis *et al.*, 2005; and Kumar and Lee, 2006) of the retail investors, more and more institutional capital flows by the FIIs and domestic institutions, including mutual funds (MFs), financial institutions (FIs) and high net-worth individuals (HNIs), drive individual investors' sentiment to invest in the Indian stock market. All these studies substantiate the role of institutional investors' activities in improving stock market liquidity directly and indirectly by influencing retail investors' sentiment. Accordingly, the *sixth hypothesis* of our study is as follows:

H6. Institutional investors' investment activities (IIIA) drive retail investors' sentiment to invest in the Indian stock market.

Empirical studies highlight the critical role that market technical play in impacting and assessing short-term (mostly) investors' sentiment. Dash and Mahakud (2012) select twelve market technical factors such as advance decline ratio (ADR), change in margin borrowing (CMB), buy-sell imbalance ratio (BSIR), put-call ratio (PCR) and number of IPOs (NIPO) and price-to-earnings high-low difference (PEhld) to identify significant impact of them on investors' sentiment. Uygur and Tas (2012) observe that most of the market-based technical proxies are derived from empirical puzzles such as closed-end fund discount (Baker and Wurgler, 2006) and IPO under-pricing (see earlier). Moreover, it is evident that positive ADR, BSIR, NIPO, as well as negative PCR and PEhld, positively influence retail investors and vice versa. Accordingly, the *seventh hypothesis* of our study is as follows:

H7. Market technical factors (MTF) drive retail investors' sentiment to invest in the Indian stock market".

2.2 Retail investors' demographics as a moderator

It is imperative and reported in the empirical literature that retail investors' demographics such as age, gender and marital status (Barber and Odean, 2001; Chattopadhyay and Dasgupta, 2015, 2019; Davar and Gill, 2007; Deaves *et al.*, 2009; Lewellen *et al.*, 1977; Pandey, 2003; Poterba *et al.*, 2006; Shaikh and Kalkundrikar, 2011; Yosra and Younes, 2013) and socioeconomic factors such as number of dependents, education, employment, income

level, investment pattern, amount and returns in and from equities (Antonites and Wordsworth, 2009; Barlow *et al.*, 1966; Chattopadhyay and Dasgupta, 2015, 2019; Feldstein and Yitzhaki, 1982; Lease *et al.*, 1976; Lewellen *et al.*, 1977; Pandey, 2003; Shaikh and Kalkundrikar, 2011; Xiao, 1996) play a critical role in moderating their investment decisions in stock markets.

In one of the earliest studies, Lewellen *et al.* (1977) report that age, gender, income and education affect investors' preferences. Pandey (2003) observes that younger investors are inclined to take more risks compared to their older counterparts, whereas Poterba *et al.* (2006) suggest that age-wealth profiles sharply rise when households are in their thirties and forties; however, these declines much more gradually when households are in their retirement years. Chattopadhyay and Dasgupta (2015) confirmed that aged investors are more risk-averse than their younger, inexperienced counterparts. Yosra and Younes (2013) provide evidence that elder people with more experience in markets are less subject to sentiment and biases; [2] however, if they are relatively less knowledgeable and have lower income level, then the reverse situation takes place.

Davar and Gill's (2007) study on exploration of the role of gender reveal that there is higher level of awareness for males than females for different investment avenues. Barber and Odean (2001) demonstrated that males trade more aggressively than females, incur higher transaction costs and consequently earn lower (post-transaction cost) returns. Return on equity (ROE)/Return on investment (ROI) (Bennet *et al.*, 2011) is therefore extremely significant for all retail investors [3]. Chattopadhyay and Dasgupta (2015) report that women investors are more risk prone than their male counterparts. However, Deaves *et al.* (2009) show that there is little evidence that gender influences trading activity.

Pandey (2003) report that unmarried singles are more risk takers in their early career ages than those with family and children. Xiao (1996) report that most households with young children do not hold risky assets. However, households with children in their middle (6–11) years and young adolescent (12–17) years tend to be less risk-averse. However, Chattopadhyay and Dasgupta (2015) report that married investors with children and other dependents are more risk-averse than their unmarried and with less dependents counterparts [4].

The relationship between education and portfolio selection has been studied first by Barlow *et al.* (1966) and Lease *et al.* (1976). Lease *et al.* (1976) report that highly educated investors tend to prefer more diversified portfolios than the less educated ones. This result agrees with Barlow *et al.* (1966) who earlier show that households headed by professional employees with high education have higher preference for current yield low-risk ratio than their less educated counterparts. More educated investors are possibly more aware of the stock market and the way it operates. Chattopadhyay and Dasgupta (2015) report that higher education brings risk-tolerance attitude and thereby makes investors risk prone. These results have been corroborated by Gilliam and Chatterjee (2011).

Antonites and Wordsworth (2009) report a clear distinction between the self-employed and those who work for pay outside the home and the unemployed; furthermore, they consider that business sector individuals and other entrepreneurs typically lead to higher levels of risk-taking than employees who are on a straight salary or wage [5]. However, Chattopadhyay and Dasgupta (2015) report that employment status is immaterial in regard to Indian retail investors' risk-attitude.

However, all these results indicate that lower income individual investors have lower risk-tolerance, which justifies that they would be risk-averse because they have little flexibility with their regular budgets (Riley and Chow, 1992). However, some studies (Faff *et al.*, 2008) suggest a negative impact of income on such risk-tolerance levels. Feldstein and Yitzhaki (1982) report that high-income individuals have larger portfolios and could

therefore devote more time or resources to their investments, thereby resulting in higher returns from equities. Chattopadhyay and Dasgupta (2015) report that higher investments amount and returns from such investments increase the risk-tolerance level and thereby reduces risk-aversion of these investors [6].

Overall, Shaikh and Kalkundrikar (2011) and Chattopadhyay and Dasgupta (2019) results show that, in the Indian context, retail investors' demographic and socioeconomic factors such as age, employment status, income level and investment pattern significantly influence their sentiment to invest in the Indian stock market. Accordingly, the *eighth and final hypothesis* of our study is as follows:

H8. Demographic and socioeconomic factors moderate the drive of retail investors' sentiment to invest in the Indian stock market".

3. Research methodology

3.1 Sample and data collection

Research methodology provides the framework and boundary for data collection and undertaking of further analysis (Bryman and Bell, 2007; and Ghauri and Grønhaug, 2010). Here, we use a cross-sectional research design to formulate the *investor sentiment index* (ISI) first (Dasgupta and Singh, 2019), and then investigate the stock market-specific sentiment drivers of Indian retail investors. This is also because we have collected data in a single time, i.e. during 2016 and not in different stages (Bryman and Bell, 2007). Moreover, we collected data mostly through face-to-face structured interviews, but for few respondents through post/mail (in line with Saunders *et al.*, 2009). This process is conducted for all 576 respondents selected on the basis of stratified random sampling technique after giving due consideration to individual respondent's heterogeneity. It allows us to select differentiated samples of retail investors representing the overall population (in line with Bryman and Bell, 2007), and makes our results more reliable because of the size effect and their representativeness (Saunders *et al.*, 2009).

We constructed our structured questionnaire [7] into three parts – retail investors' demographics, socio-economic and economic status information; eight statements forming the ISI; and eighteen statements representing the stock market drivers of retail investors' sentiment. We computed composite statements scores for the ISI and undertaken stock market drivers. In terms of retail investors' demographics, socio-economic and economic status (Table 1), nominal (gender and marital status) and ordinal (age, number of dependents, educational status, and total investment in stock market) measurements are used (in line with Ghauri and Grønhaug, 2010). For our second and third parts, we used a five-point Likert scale to survey our respondent Indian retail investors (in line with Fisher and Buglear, 2010) to form their individual ISI scores and collect their opinions in regard to stock market-specific drivers as represented by the eighteen statements of the third part. Then, in the survey, sample respondents rate each item on a scale of 1 (strongly disagree) to 5 (strongly agree), indicating the extent to which they think how each of the items (representing different market drivers) is likely to influence their decision to invest in the Indian stock market.

Moreover, we pretest the survey questionnaire with 50 retail investors during late 2015 to ensure the meaning and wording of the statements and then adjusted accordingly before conducting the final survey. In the final survey, the sample size initially covers 750 heterogeneous retail investors. However, only 576 of them (i.e. 76.8%) responded with all answers who have ultimately become our study respondents.

Demographic items	No. of respondents
Age	
< 45 years	305
≥ 45 $\psi\varepsilon\alpha\rho\sigma$	271
Gender	
Male	497
Female	79
Marital status:	
Married	512
Unmarried/Single	64
No. of dependents	
≤ 2	278
03-Apr	230
≥ 5	68
Educational status	
≤ Graduate	511
> Graduate	65
[Post-graduate and more (including professional qualifications)]	
Employment status	
Central/State govt./ Govt. undertaking	52
Private/Self-employed/business	524
Monthly income level	
≤ Rs.15,000	13
Rs.15,001-40,000	191
Rs.40,001-59,999	269
≥ Pσ0.60,000	103
Investment pattern (monthly investment %)	
≥ 50% in equity and equity-related products	442
< 50% in equity and equity-related products	134
Total investment in stock market	
≤ Rs.10,00,000	479
Rs.10,00,001-Rs.24,99,999	82
≥ Rs.25,00,000	15
Monthly ROI (in %) from the stock market	
≤ 10%	378
10.01-25%	180
25.01-49.99%	18
≥ 50%	0

Table 1.
Demographic data of respondents

Notes: This table provides the demographic data in regard to age, gender, marital status, number of dependents (spouse, sons/daughters, dependent father and/or mother and/or others), educational status, employment status, monthly income level (in Rs.), investment pattern (monthly investment %), total investment in stock market (in Rs.) and ROI (%) from the stock market monthly of the 576 respondents undertaken here

3.2 Demographic data analysis

Our data represents approximately 53% of young and remaining experienced (more than 45 years of age) with more than 20 year experience in investing in stock markets. However, we could capture only approximately 14% women investors' investment techniques because of their lower participation in stock markets. Our data comprise more married investors (approximately 89%). The survey respondents include approximately 89% of less than graduate up to graduate retail investors, whereas approximately 91% of them are working in private sector or having own business. In regard to respondents' income, savings and investment patterns, we incorporate lower end retail investors rather than rich investors with high income, investment and expected ROI from stock markets. All these demographic characteristics of study respondents help us to capture investors' sentiment of the middle-class Indian retail investors.

3.3 Construction of the investor sentiment index

Empirical literature in behavioral finance provides us two measures of '*investor sentiment*' - a direct survey-based measure (Brown and Cliff, 2005) and an indirect measure constructed with the use of implicit market sentiment proxies (Baker and Wurgler, 2006).

We argue that, although a survey-based measure of investor sentiment is subject to response biases and methodological issues, it could best capture what we practically think of as '*investor sentiment*'. This is because we define '*investor sentiment*' as the erroneous beliefs of Indian retail investors in relation to the '*fundamental value*' benchmark and '*Bayesian updating*' (Brown and Cliff, 2005), which is resulting into two principal conclusions - an individual investor's subjective beliefs and the objective benchmark of fundamental value. Therefore, it is logical to attempt to assess the first conclusion of personal beliefs of investors by asking them what they believe the economy or stock market would be like in each future period and their following market actions. Therefore, we can definitely use the responses to our well thought statements to construct the measure of *investors' sentiment*, i.e. the *investor sentiment index* (ISI). Our ISI questions are agree with Montgomery Investor Sentiment Survey (2016) conducted for Australian investors and Yale School of Management's Stock Market Confidence Index (refer www.icf.som.yale.edu/ financialdata/ confidence index/) survey, which were careful not to ask respondents about their precise expectations for the future. This augments the documentary evidence (Shiller, 2000) that most people do not in fact have precise estimates for future changes over specific time horizons and when asked for numerical values merely make them up to please the interviewer. In addition, unlike the Michigan (1978) survey, our ISI questions corroborate with the Yale survey that exclusively focuses on forward-looking beliefs. Moreover, we ask about expectations for the stock market rather than the economy in general. Accordingly, we argue that our eight ISI survey questions and subsequent construction of the ISI is robust in nature.

3.4 Multiple regression models

We use multiple regression analysis (Gujarati, 2007) to test our hypotheses about the probable existence of causal effects, and therefore to estimate the strength of those effects and to compare the existing strength of such effects across groups (Stolzenberg, 2004). We then estimated multiple regression equation [Equation (1)] for 576 sample respondents.

We classified them based on their ISI scores (in ascending order) into low-sentiment (bottom 33.33%), medium-sentiment (33.34–66.67%) and high-sentiment (66.68-100% [i.e. top 33.33%]) investors to run our models to examine whether we identify any distinctive pattern in comparison to overall results. This is used as a robustness test of our main findings.

We used seven independent variables constructed from eighteen statements, i.e. *nature of the stock markets* (NSM), *index and/or stock returns with appropriate pricing* (I&SR), *investors' friendly market environment* (IFME), *IPO activities/issues and information certainty* (IPO&IC), *trading volume and momentum* (TV&M), *institutional investors' investment activities* (IIIA), *market technical factors* (MTF), to examine their influence on Indian retail investors' sentiment (represented by the *ISI* scores [dependent variable]). In our multiple regression model, we control for investors' *age* (AGE) [if ≥ 45 years = 1, otherwise 0); *gender* (GEN) [0 = male, 1 = female]; *marital status* (MS) [0 = Married, 1 = Single/Divorcee]; *number of dependents* (DEP) [lognormal of actual number]; *educational status* (ES) [1 = more than graduate, 0 = graduate or less]; *employment status* (EMS) [1 = working in private sector/self-employed, 0 = government/PSU employee]; *monthly income level* (INL) [lognormal of actual amount]; *investment pattern* (INP) [1 = if $< 50\%$ p.m. of total investment in other than stock market instruments, 0 = if $\geq 50\%$]; *total investment in stock market till survey date* (INSM) [lognormal of actual amount of investment] and *monthly return on investment from stock market* (ROI) [in actual per cent] as control or dummy variables in line with prescribed empirical literature.

We then verify for the assumptions of normality, multi-collinearity and auto-correlation before running the regression model. The Kolmogorov–Smirnov (K-S) goodness-of-fit test shows that our data set does not violet the normality assumption. The Durbin-Watson values prove that auto-correlation is also not present in them. In addition, the correlation matrix and the value of VIF (Variance Inflation Factor) VIF ($\beta_i < 10$) show that multi-collinearity is also not an issue for the variables used by us (in line with Khan *et al.*, 2016).

Thereby, we investigate our research hypotheses by formulating the following multiple regression model:

$$\begin{aligned} \text{ISI} = {} & \beta_0 + \beta_1\text{NSM} + \beta_2\text{I\&SR} + \beta_3\text{IFME} + \beta_4\text{IPO\&IC} + \beta_5\text{TV\&M} + \beta_6\text{IIIA} \\ & + \beta_7\text{MTF} + \beta_8\text{AGE} + \beta_9\text{GEN} + \beta_{10}\text{MS} + \beta_{11}\text{DEP} + \beta_{12}\text{ES} \\ & + \beta_{13}\text{EMS} + \beta_{14}\text{INL} + \beta_{15}\text{INP} + \beta_{16}\text{INSM} + \beta_{17}\text{ROI} + \varepsilon \end{aligned} \quad (1)$$

4. Empirical results

4.1 Correlations results

Table 2 presents correlations results. It is evident that all the studied variables except NSM have significant relationships with the investor sentiment index (ISI) as constructed here. Except IFME, all other market drivers impact investors' sentiment positively which is in line with our hypothesized model. It also validates our study objectives to investigate the stock market drivers, which influence Indian retail investors to invest in stock markets. It is also observed from correlations results that age, gender, marital status, number of dependents, total investment in stock market till date (i.e. lagged investment) and return on investment (ROI) from stock market monthly (i.e. lagged monthly returns) have no significant relationships with the ISI. However, most of our studied independent and control/dummy variables do have significant positive/negative correlations between themselves as observed from Table 2.

Table 2.
Correlations results

Variables	ISI	NSM	I&SR	IFME	IPO&IC	TV&M	IIIA	MTF	AGE	GEN	MS	DEP	ES	EMS	INL	INP	INSM	ROI
ISI	1																	
NSM	0.022	1																
I&SR	*0.293***	*0.145***	1															
IFME	*−0.242***	−0.063	*−0.244***	1														
IPO&IC	*0.320***	−0.022	*0.107***	*−0.307***	1													
TV&M	*0.488***	*0.174***	*0.539***	*−0.297***	*0.220***	1												
IIIA	*0.360***	*0.138***	*0.440***	*−0.145***	*0.104***	*0.532***	1											
MTF	*0.384***	*0.136***	*0.485***	*−0.298***	*0.136***	*0.662***	*0.508***	1										
AGE	−0.014	*0.086***	−0.036	−0.039	*−0.230***	0.043	0.054	*−0.102***	1									
GEN	0.063	0.054	*0.069**	*−0.080**	*0.193***	0.007	0.023	0.063	*−0.311***	1								
MS	−0.019	−0.057	0.060	0.024	*0.124***	−0.026	*−0.092***	−0.032	*−0.418***	*0.283***	1							
DEP	−0.054	0.107***	0.041	*0.152***	*−0.162***	*0.077**	0.046	0.023	*0.373***	*−0.307***	*−0.309***	1						
ES	*0.106***	−0.048	*0.080**	−0.011	0.015	*0.099***	*0.145***	0.065	*0.093***	*−0.090***	0.000	−0.059	1					
EMS	*0.239***	0.020	0.044	*−0.112***	0.064	*0.146***	−0.034	*0.124***	0.011	0.017	0.059	*−0.097***	0.040	1				
INL	*−0.088***	0.036	*−0.133***	*0.100***	*−0.267***	*−0.085***	0.009	−0.053	*0.328***	*−0.284***	*−0.291***	*0.150***	0.059	*−0.146***	1			
INP	*−0.306***	*0.084***	*−0.274***	*0.211***	*−0.103***	*−0.344***	*−0.233***	*−0.332***	0.065	0.050	−0.009	−0.001	−0.035	*−0.209***	−0.001	1		
INSM	0.049	*0.134***	*0.144***	*−0.130***	*−0.075**	*0.188***	*0.094***	*0.079**	*0.225***	*−0.136***	*−0.095***	0.043	*0.159***	*−0.073**	*0.292***	*−0.098***	1	
ROI	−0.049	*−0.068**	−0.012	−0.059	0.041	0.052	*0.120***	*0.125***	−0.018	*−0.114***	0.043	−0.044	*0.193***	*−0.092***	*0.128***	*−0.165***	*0.398***	1

Notes: * Significance values at 10% level ($p < 0.10$); ** Significance values at 5% level ($p < 0.05$); *** Significance values at 1% level ($p < 0.01$). This table provides the correlations in between our dependent variable (i.e. the ISI) and independent variables i.e. *nature of the stock markets* (NSM), *index and/or stock returns with appropriate pricing* (I&SR), *investors' friendly market environment* (IFME), *IPO activities/issues and information certainty* (IPO&IC), *trading volume and momentum* (TV&M), *institutional investors' investment activities* (IIIA), *market technical factors* (MTF); and all control/dummy variables i.e. *age* (AGE) (a dummy variable), gender (GEN) (a dummy variable), marital status (MS) (a dummy variable), number of dependents (DEP), educational status (ES) (a dummy variable), employment status (EMS) (a dummy variable), monthly income level (INL), investment pattern (INP) (a dummy variable), total investment in stock market (INSM) and monthly return on investment (i.e. ROI) from the stock market

4.2 Regression results – overall

Table 3 presents overall regression results of our model. Results show that *IPO activities/ issues and information certainty* (IPO&IC) (0.093***), *trading volume and momentum* (TV&M) (0.101***) and *institutional investors' investment activities* (IIIA) (0.108***) significantly positively influence retail investors' sentiment. No other market drivers impact such sentiment on an overall basis. Therefore, we accept *H4, H5, H6* to be true for influencing Indian retail investors' sentiment.

The IPO&IC has significant positive impact on both high (0.043***) and low sentiment (0.085***) investors also. On the contrary, IIIA (0.101***) and *market technical factors* (MTF) (0.085**) only impact high and low sentiment investors respectively. It is intriguing to report that *nature of the stock markets* (NSM) show conflicting results for high (−0.038***) and low (0.087***) sentiment investors. Similarly, TV&M results contradict for the high sentiment investors (−0.040**) with that of our overall findings. Therefore, few other drawn hypotheses are only partly true. The R^2, Adj R^2, F-results and VIF validate the authenticity of our results.

Our results also show (see Table 3) that investors' employment status (EMS) (0.249***) positively and investment pattern (INP) (−0.142***) monthly return on investment (i.e. ROI) (−0.111***) are negatively influencing overall retail investors' sentiment to invest in the Indian stock market. On the contrary, in line with previous empirical studies (Antonites and Wordsworth, 2009; Barber and Odean, 2001; Chattopadhyay and Dasgupta, 2015, 2019; Shaikh and Kalkundrikar, 2011; Yosra and Younes, 2013) our results also point out that investors' marital status (MS) (−0.131* [low sentiment]), number of dependents (DEP) (0.116** [high sentiment] and −0.335** [low sentiment]), total investment in stock market (INSM) (0.183*** [low sentiment]) and ROI (0.043** [high sentiment] and −0.172*** [low sentiment]) also influence their investment decision making for high and low sentiment investors. Therefore, here we use all these demographic variables to find their moderating effect in regard to influencing investors' sentiment.

4.3 Regression results – demography-based

We present our demography-based regression results under Tables 4-6. Though we have run regressions for all variables including control and dummy variables, but, here we report only the independent variables results for all demographic characteristics for the sake of brevity. The VIF values under all results are within permitted range (i.e. < 10), but not shown here also for brevity purpose. We report regression results for age, gender and marital status (social demographics) under Table 4; dependents, educational and employment status (socio-economic demographics) under Table 5; and monthly income, investment pattern, total investment and ROI (economic demographics) under Table 6.

Demography-based results show that market drivers like IPO&IC, TV&M and IIIA are influencing young and experienced, male and female, married unmarried/single, burdened with higher or lower dependents, graduate or more educated, privately employed or self-employed, investors earning both low and high returns (i.e. ROI), investors with high income level, risk-seeking higher equity-oriented and investors having investment up to Rs.10,00,000 significantly positively. However, intriguingly, IIIA impact government employees' investors and risk-averse non-equity-oriented retail investors significantly negatively. On the contrary, NSM has a significant negative impact on experienced ($\geq$ 45 years; −0.068***), female (−0.073*), unmarried/single (−0.140**), investors with lower dependents (−0.041*), private/self-employed (−0.026*), higher income level (−0.035*), investors having investment up to Rs.10,00,000 (−0.033*) and investors earning up to 10% ROI p.m. (−0.090***), such retail investors. However, NSM interestingly impact highly

Table 3.
Regression results

Variables	Overall			High sentiment			Low sentiment		
	β	t value	VIF	β	t value	VIF	β	t value	VIF
Constant	*2.271*** (0.243)*	9.327	-	*3.748*** (0.180)*	20.817	-	*2.535*** (0.238)*	10.641	-
NSM	−0.023 (0.016)	−1.477	1.122	*−0.038*** (0.011)*	−3.570	1.334	*0.087*** (0.024)*	3.593	1.265
I&SR	−0.005 (0.017)	−0.306	1.645	0.004 (0.009)	0.455	1.170	−0.041 (0.028)	−1.461	2.127
IFME	−0.006 (0.019)	−0.343	1.334	−0.024 (0.019)	−1.294	1.349	0.011 (0.028)	0.402	1.488
IPO&IC	*0.093*** (0.016)*	5.815	1.287	*0.043*** (0.012)*	3.604	1.745	*0.085*** (0.026)*	3.326	1.241
TV&M	*0.101*** (0.021)*	4.900	2.438	*−0.040** (0.017)*	−2.393	1.364	−0.004 (0.031)	−0.133	3.281
IIIA	*0.108*** (0.030)*	3.594	1.649	*0.101*** (0.024)*	4.204	1.522	0.026 (0.036)	0.710	1.698
MTF	0.035 (0.026)	1.341	2.190	0.021 (0.018)	1.170	1.706	*0.085** (0.039)*	2.169	2.682
AGE	0.008 (0.016)	0.494	1.627	−0.026 (0.025)	−1.058	2.367	0.055 (0.041)	1.340	1.372
GEN	0.021 (0.042)	0.501	1.292	−0.005 (0.025)	−0.195	1.495	−0.032 (0.061)	−0.521	1.333
MS	−0.039 (0.049)	−0.783	1.361	−0.004 (0.033)	−0.117	1.495	*−0.131* (0.067)*	−1.954	1.356
DEP	−0.091 (0.084)	−1.091	1.372	*0.116** (0.053)*	2.191	1.276	*−0.335** (0.130)*	−2.586	1.551
ES	0.066 (0.043)	1.526	1.101	−0.018 (0.026)	−0.702	1.333	0.024 (0.072)	0.333	1.144
EMS	*0.249*** (0.061)*	4.064	1.156	0.011 (0.112)	0.095	1.040	0.072 (0.058)	1.245	1.216
INL	0.013 (0.032)	0.413	1.386	−0.008 (0.018)	−0.452	2.955	−0.009 (0.027)	−0.333	1.396
INP	*−0.142*** (0.045)*	−3.129	1.309	0.103 (0.074)	1.405	1.324	−0.075 (0.049)	−1.537	1.525
INSM	0.043 (0.043)	1.014	1.490	−0.020 (0.027)	−0.747	2.016	*0.183*** (0.050)*	3.674	1.505
ROI	*−0.111*** (0.032)*	−3.462	1.373	*0.043** (0.018)*	2.339	1.514	*−0.172*** (0.037)*	−4.638	1.451
R2	*0.366*			*0.379*			*0.332*		
Adj. R2	*0.346*			*0.318*			*0.266*		
F value	*18.934****			*6.274****			*5.080****		

Notes: This table provides the overall, top 33.33% [high sentiment] and bottom 33.33% [low sentiment] (based on ISI scores) regression results. Here, our dependent variable is the ISI and independent variables are - i.e. nature of the stock markets (NSM), index and/or stock returns with appropriate pricing (I&SR), investors' friendly market environment (IFME), IPO activities/issues and information certainty (IPO&IC), trading volume and momentum (TV&M), institutional investors' investment activities (IIIA), market technical factors (MTF). We also incorporate control/dummy variables of age (AGE) (a dummy variable), gender (GEN) (a dummy variable), marital status (MS) (a dummy variable), number of dependents (DEP), educational status (ES) (a dummy variable), employment status (EMS) (a dummy variable), monthly income level (INL), investment pattern (INP) (a dummy variable), total investment in stock market (INSM) and monthly return on investment (i.e. ROI) from the stock market. *Significance values at 10% level ($p < 0.10$); ** Significance values at 5% level ($p < 0.05$); *** Significance values at 1% level ($p < 0.01$). # Standard errors in parentheses

Table 4.
Regression results (social demographics)

	Age classification				Gender classification				Marital status classification			
	< 45 years		≥ 45 years		Male		Female		Married		Unmarried/Single	
Variables	β	*t* value	β	*t* value	β	*t* value	β	*t* value	β	*t* value	β	*t* value
Constant	*2.696*** *(0.262)*	10.287	*2.736*** *(0.225)*	12.146	*2.599*** *(0.191)*	13.599	*1.918*** *(0.501)*	3.824	*2.690*** *(0.183)*	14.669	*1.705*** *(0.641)*	2.659
NSM	−0.005 (0.023)	−0.235	*−0.068*** *(0.021)*	−3.324	−0.025 (0.017)	−1.463	*−0.073** *(0.043)*	−1.710	−0.014 (0.017)	−0.856	*−0.140*** *(0.060)*	−2.337
I&SR	−0.020 (0.023)	−0.858	−0.004 (0.020)	−0.173	−0.022 (0.018)	−1.220	*0.066** *(0.036)*	1.836	−0.015 (0.017)	−0.872	0.095 (0.077)	1.224
IFME	−0.040 (0.029)	−1.347	−0.001 (0.022)	−0.040	−0.013 (0.020)	−0.629	−0.020 (0.053)	−0.369	−0.026 (0.019)	−1.354	0.043 (0.073)	0.591
IPO&IC	*0.143*** *(0.026)*	5.613	0.021 (0.020)	1.086	*0.076*** *(0.018)*	4.262	*0.210*** *(0.045)*	4.665	*0.081*** *(0.017)*	4.819	*0.192*** *(0.077)*	2.511
TV&M	*0.078*** *(0.028)*	2.811	*0.114*** *(0.028)*	4.090	*0.104*** *(0.023)*	4.591	*0.095*** *(0.045)*	2.110	*0.090*** *(0.022)*	4.111	0.068 (0.066)	1.037
IIIA	*0.117*** *(0.042)*	2.789	*0.073** *(0.039)*	1.875	*0.100*** *(0.033)*	3.055	*0.215*** *(0.068)*	3.175	*0.085*** *(0.032)*	2.668	*0.183** *(0.098)*	1.869
MTF	0.009 (0.038)	0.235	0.031 (0.033)	0.916	*0.056** *(0.030)*	1.876	−0.066 (0.054)	−1.227	*0.055** *(0.028)*	1.953	−0.063 (0.086)	−0.741
R2	*0.407*		*0.541*		*0.360*		*0.643*		*0.383*		*0.582*	
Adj. R2	*0.375*		*0.512*		*0.338*		*0.560*		*0.363*		*0.430*	
F value	*12.566****		*18.373****		*16.619****		*7.772****		*19.324****		*3.829****	

Notes: This table provides social demographics-based regression results. Here, our dependent variable is the ISI and independent variables are - i.e. *nature of the stock markets* (NSM), *index and/or stock returns with appropriate pricing* (I&SR), *investors' friendly market environment* (IFME), *IPO activities/issues and information certainty* (IPO&IC), *trading volume and momentum* (TV&M), *institutional investors' investment activities* (IIIA), *market technical factors* (MTF). We also incorporate control/dummy variables of age (AGE) (a dummy variable), gender (GEN) (a dummy variable), marital status (MS) (a dummy variable), number of dependents (DEP), educational status (ES) (a dummy variable), employment status (EMS) (a dummy variable), monthly income level (INL), investment pattern (INP) (a dummy variable), total investment in stock market (INSM) and monthly return on investment (i.e. ROI) from the stock market as required in the respective model. For example, in case of age classification, age dummy would not be used. However, we don't report detailed results for the sake of brevity. *Significance values at 10% level ($p < 0.10$); ** Significance values at 5% level ($p < 0.05$); *** Significance values at 1% level ($p < 0.01$). # Standard errors in parentheses

Table 5.
Regression results (socio-economic demographics)

Variables	Dependents classification				Educational status classification				Employment status classification			
	≤ 2 dependents		> 2 dependents		≤ Graduate		> Graduate		Govt./PSUs		Private/Self-employed	
	β	t value	β	t value	β	t value	β	t value	β	t value	β	t value
Constant	*2.158*** (0.245)*	8.827	*2.976*** (0.276)*	10.772	*2.583*** (0.192)*	13.430	*2.278*** (0.619)*	3.679	*7.253*** (1.996)*	3.634	*2.678*** (0.163)*	16.433
NSM	*−0.041** (0.021)	−1.953	−0.019 (0.023)	−0.803	−0.018 (0.017)	−1.028	−0.060 (0.063)	−0.957	0.004 (0.124)	0.032	*−0.026** (0.016)*	−1.624
I&SR	0.012 (0.022)	0.557	−0.029 (0.024)	−1.223	−0.004 (0.018)	−0.220	*−0.083** (0.050)*	−1.674	0.038 (0.137)	0.273	−0.012 (0.017)	−0.717
IFME	0.042 (0.026)	1.594	*−0.063*** (0.026)*	−2.386	−0.012 (0.020)	−0.585	0.033 (0.075)	0.446	−0.060 (0.159)	−0.377	−0.004 (0.019)	−0.227
IPO&IC	*0.161*** (0.022)*	7.151	0.029 (0.025)	1.146	*0.082*** (0.018)*	4.546	*0.106** (0.056)*	1.873	−0.078 (0.260)	−0.300	*0.096*** (0.016)*	5.814
TV&M	*0.093*** (0.025)*	3.752	*0.088*** (0.033)*	2.700	*0.101*** (0.022)*	4.612	*0.150*** (0.064)*	2.352	0.141 (0.178)	0.788	*0.109*** (0.020)*	5.296
IIIA	*0.157*** (0.035)*	4.470	0.063 (0.049)	1.293	*0.107*** (0.032)*	3.338	0.067 (0.101)	0.667	*−0.307** (0.160)*	−1.917	*0.111*** (0.030)*	3.696
MTF	−0.018 (0.030)	−0.602	*0.084** (0.044)*	1.912	0.035 (0.028)	1.274	0.015 (0.103)	0.147	−0.254 (0.219)	−1.162	*0.044** (0.026)*	1.669
R2	*0.519*		*0.333*		*0.375*		*0.533*		*0.764*		*0.358*	
Adj. R2	*0.490*		*0.295*		*0.355*		*0.381*		*0.512*		*0.339*	
F value	*17.607****		*8.761****		*18.510****		*3.496****		*3.029***		*18.389****	

Notes: This table provides socio-economic demographics-based regression results. Here, our dependent variable is the ISI and independent variables are - i.e. *nature of the stock markets* (NSM), *index and/or stock returns with appropriate pricing* (I&SR), *investors' friendly market environment* (IFME), *IPO activities/issues and information certainty* (IPO&IC), *trading volume and momentum* (TV&M), *institutional investors' investment activities* (IIIA), *market technical factors* (MTF). We also incorporate control/dummy variables of age (AGE) (a dummy variable), gender (GEN) (a dummy variable), marital status (MS) (a dummy variable), number of dependents (DEP), educational status (ES) (a dummy variable), employment status (EMS) (a dummy variable), monthly income level (INL), investment pattern (INP) (a dummy variable), total investment in stock market (INSM) and monthly return on investment (i.e. ROI) from the stock market as required in the respective model. For example, in case of educational status classification, educational status dummy would not be used. However, we don't report detailed results for the sake of brevity. *Significance values at 10% level ($p < 0.10$); ** Significance values at 5% level ($p < 0.05$); *** Significance values at 1% level ($p < 0.01$). # Standard errors in parentheses

Table 6.
Regression results (economic demographics)

Variables	β	*t* value	β	*t* value	β	*t* value	β	*t* value
	Monthly income level classification				Investment pattern classification			
	≤ Rs.40,000		> Rs.40,000		≥ 50% in equity and equity-related products		< 50% in equity and equity-related products	
Constant	*1.560*** (0.340)*	4.589	*3.113*** (0.203)*	15.313	*2.426*** (0.199)*	12.174	*2.924*** (0.386)*	7.582
NSM	−0.036 (0.025)	−1.480	*−0.035* (0.020)*	−1.744	−0.027 (0.017)	−1.581	0.010 (0.051)	0.196
I&SR	−0.023 (0.029)	−0.802	−0.025 (0.019)	−1.349	−0.005 (0.017)	−0.276	−0.045 (0.051)	−0.884
IFME	*0.072** (0.031)*	2.313	*−0.064*** (0.023)*	−2.784	−0.015 (0.020)	−0.746	0.083 (0.053)	1.582
IPO&IC	*0.196*** (0.028)*	6.942	0.028 (0.019)	1.476	*0.096*** (0.018)*	5.324	0.029 (0.047)	0.617
TV&M	*0.117*** (0.032)*	3.590	*0.097*** (0.025)*	3.951	*0.093*** (0.022)*	4.229	0.069 (0.053)	1.306
IIIA	*0.153*** (0.048)*	3.222	*0.066* (0.035)*	1.849	*0.134*** (0.033)*	4.088	*−0.137** (0.059)*	−2.301
MTF	0.001 (0.039)	0.014	0.051 (0.033)	1.551	0.031 (0.028)	1.105	*0.154** (0.068)*	2.263
R2	*0.569*		*0.395*		*0.302*		*0.723*	
Adj. R2	*0.532*		*0.368*		*0.279*		*0.641*	
F value	*15.292****		*14.591****		*13.209****		*8.824****	
	Total investment in stock market				Monthly ROI (stock market)			
	≤ Rs.10,00,000		> Rs.10,00,000		≤ 10%		> 10%	
Constant	*2.477*** (0.199)*	12.436	*3.026*** (0.462)*	6.556	*2.707*** (0.184)*	14.722	*1.146*** (0.388)*	2.950
NSM	*−0.033* (0.018)*	−1.877	*0.078* (0.041)*	1.889	*−0.090*** (0.017)*	−5.270	*0.117*** (0.035)*	3.353
I&SR	−0.007 (0.019)	−0.351	−0.030 (0.029)	−1.018	0.016 (0.018)	0.882	−0.018 (0.033)	−0.538
IFME	−0.003 (0.021)	−0.142	−0.010 (0.050)	−0.192	−0.011 (0.020)	−0.556	0.041 (0.044)	0.945
IPO&IC	*0.102*** (0.019)*	5.305	0.050 (0.032)	1.578	*0.071*** (0.018)*	3.907	*0.157*** (0.035)*	4.440
TV&M	*0.101*** (0.023)*	4.448	0.040 (0.043)	0.940	*0.120*** (0.021)*	5.602	0.050 (0.042)	1.207
IIIA	*0.116*** (0.034)*	3.470	0.000 (0.059)	0.006	*0.079** (0.032)*	2.509	*0.180*** (0.063)*	2.854
MTF	0.039 (0.029)	1.331	0.071 (0.051)	1.412	0.011 (0.027)	0.397	*0.099* (0.058)*	1.710
R2	*0.391*		*0.459*		*0.457*		*0.401*	
Adj. R2	*0.370*		*0.350*		*0.433*		*0.349*	
F value	*18.537****		*4.234****		*18.796****		*7.742****	

Notes: This table provides economic demographics-based regression results. Here, our dependent variable is the ISI and independent variables are - i.e. nature of the stock markets (NSM), index and/or stock returns with appropriate pricing (I&SR), investors' friendly market environment (IFME), IPO activities/issues and information certainty (IPO&IC), trading volume and momentum (TV&M), institutional investors' investment activities (IIIA), market technical factors (MTF). We also incorporate control/dummy variables of age (AGE) (a dummy variable), gender (GEN) (a dummy variable), marital status (MS) (a dummy variable), number of dependents (DEP), educational status (ES) (a dummy variable), employment status (EMS) (a dummy variable), monthly income level (INL), investment pattern (INP) (a dummy variable), total investment in stock market (INSM) and monthly return on investment (i.e. ROI) from the stock market as required in the respective model. For example, in case of investment pattern classification, investment pattern dummy would not be used. However, we don't report detailed results for the sake of brevity. *Significance values at 10% level ($p < 0.10$); ** Significance values at 5% level ($p < 0.05$); *** Significance values at 1% level ($p < 0.01$). # Standard errors in parentheses

invested (total investment > Rs.10,00,000) and high earning (> 10% ROI p.m.) investors significantly positively to invest in the Indian market. We also report negative impact of IFME and I&SR on certain class of investors. Other market drivers as hypothesized here are mostly not having significant influence across investors' demography-based classifications. The R^2, Adj R^2, F-results and VIF validate the authenticity of these results and validate our overall proposition that demographic characteristics play a significant role in driving retail investors' sentiment in relation to market drivers.

5. Discussions and conclusion

On an overall basis, we report that *IPO activities/issues and information certainty, trading volume and momentum* and *institutional investors' investment activities* market drivers significantly and positively impact retail investors. However, only *IPO activities/issues and information certainty* influences both high- and low-sentiment investors. Our results are in line with Baker and Wurgler (2007), Jiang *et al.* (2005) and Zhang (2006). We thereby can conclude that the information certainty in regard to IPO issues and pricing mechanisms associated with it drive Indian retail investors most. It might also be because of the fact that retail investors want to earn high first day returns. However, intriguingly *trading volume and momentum* results contradict for the high-sentiment investors with that of our overall findings. Thereby, we can conclude that although overall we report results in line with Baker and Stein (2004) and Wang (2001), but, interestingly high-sentiment Indian investors show a negative influence of trading volume and momentum. This further prompts us to conclude that Indian investors are much more rational in line with Chui *et al.* (2010). In addition, we can substantiate that in line with Chakrabarti (2001) and Dash and Mahakud (2012) we did find that *institutional investors' investment activities* is a strong market driver for retail investors in India. This captures the herding impact (in line with Barberis *et al.*, 2005; and Kumar and Lee, 2006) in Indian market. On the contrary, *institutional investors' investment activities* and *market technical factors* only impact high- and low-sentiment investors respectively. These help us to justify that the above mentioned herding impact is only true for high-sentiment investors and not for all, and also market technical (other than volume and momentum) only influence low-sentiment investors which contradict with earlier study results of Dash and Mahakud (2012). It is intriguing to report that *nature of the stock markets* show conflicting results for high- (negative significant) and low- (positive significant) sentiment investors in line with earlier contradictory results from Connolly *et al.* (2007), Longin and Solnik (2001) and Odean (1998).

Our demography-based extensive results also highlight few interesting conclusions. On an overall basis, our results report that investors' *employment status* positively, and *investment pattern* and *monthly return on investment* (i.e. ROI) are negatively influencing overall retail investors' sentiment to invest in the Indian stock market. On the contrary, in line with previous empirical studies (Antonites and Wordsworth, 2009; Barber and Odean, 2001; Chattopadhyay and Dasgupta, 2015, 2019; Shaikh and Kalkundrikar, 2011; Yosra and Younes, 2013; etc.) our results also point out that investors' *marital status* [low-sentiment], *number of dependents* [both high- and low-sentiment], *total investment in stock market* [low-sentiment]) and ROI [both high- and low-sentiment] also influence both high- and low-sentiment investors' investment decision making in either positive or negative contexts. Therefore, here we use all these demographic variables to find their moderating effect in regard to influencing investors' sentiment.

Our demography-based classification results clearly depict our initial argument that investors' social, socio-economic and economic demographic characteristics moderate their stock market investments. In line with our overall results our demography-based results

report that market drivers like *IPO activities/issues and information certainty, trading volume and momentum* and *institutional investors' investment activities* are mostly influencing young and experienced, male and female, married unmarried/single, burdened with higher or lower dependents, graduate or more educated, privately employed or self-employed, investors earning both low and high returns (i.e. ROI), investors with high income level, risk-seeking higher equity-oriented and investors having investment up to Rs.10,00,000, significantly positively. However, intriguingly, IIIA impact government employees' investors and risk-averse non-equity-oriented retail investors significantly negatively. On the contrary, NSM has a significant negative impact on experienced ($\geq$ 45 years), female, unmarried/single, investors with lower dependents, private/self-employed, higher income level, investors having investment up to Rs.10,00,000 and investors earning up to 10% ROI p.m., such retail investors. However, NSM interestingly impact highly invested (total investment $>$ Rs.10,00,000) and high earning ($>$ 10% ROI p.m.) investors significantly positively to invest in the Indian market. So, it is clearly evident that retail investors' sentiment is driven by their demographic characteristics.

Our results will have significant implications for Indian investors, brokers/investment consultants, regulators and others associated with the stock markets in general. Investors will have generalized insights about how their sentiment about market drivers influences them to invest at the right time and/or in the right mode in the stock market. Brokers/investment consultants can also use these study results to frame their strategies to create awareness and develop clientele base among investors. The regulators and other related stakeholders should get a clear insight what drive Indian retail investors to enter and/or to exit in/from the market standpoint.

However, our study does not look into many indispensable drivers of investors' sentiment such as macroeconomic fundamentals and policy-specific, socio-economic and political factors, etc. Future studies can look into these untouched issues to generalize overall the determinants of Indian retail investors' sentiment that influence them to invest in the stock market.

Notes

1. This ISI has been used in an earlier paper (Chattopadhyay and DasGupta, 2019), however in a different context. The detailed construction of this Index has been reported in the methodology section.
2. In line with all these findings, we have incorporated a *age* variable which would capture the difference in between young inexperienced retail investors and their more aged and experienced counterparts.
3. For this reason, we have incorporated ROI p.m. from the invested amount in stock market as a control variable in our model.
4. Accordingly, here we have used number of dependents as a control variable which we assume would influence retail investors' sentiment to invest in the stock market.
5. We have incorporated employment status control variable in our model to capture its impact on the investors' sentiment.
6. Accordingly, to capture the volume and nature of investments, we have incorporated the amount of investment by the surveyed retail investors in stock market till study date and their investment pattern along with their ROI p.m. from the stock market.
7. We do not provide the questionnaire statements for the sake of brevity here. If asked for we can share the same.

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