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Overconfidence Bias of Retail Investors – An Empirical Review of Sources and their Stylized Facts

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Abstract: This study aims at finding the sources from which retail investors' overconfidence bias develop. Based on empirical review of the relevant literature, it finds that demography; training, investment knowledge and skills; past experiences and successes/failures and information are the key source-drivers of overconfidence at varied proportions under different situations. The stylized facts of these sources are then analyzed and conclusions drawn. The results show that demography, skills along with experience drive trading volume of the investors which in turn impact their successes/failures. The male investors being active traders and aggressive in regard to risk-attitude and risk-taking abilities are much more overconfident that their female counterparts subject to their age. The experienced investors with a proper educational background and continuous learning exercises by active trading are much more balanced than their inexperienced and younger peers. The income status drives them further. All these demographic characteristics are further augmented by their culture and personality traits. The balanced approach in gathering, evaluation and interpretation of information signals including market/stock returns make them precise and perfect. Generally higher volume of information enhances investors' overconfidence, but the quality and strength of these do matter.

Key Words: Overconfidence; Retail investors; Demography; Investing experiences.

JEL Classification: G4; G41

1. Introduction

DeBondt and Thaler (1995: 389) argue - "Perhaps the most robust finding in the psychology of judgment is that people are overconfident". Due to overconfidence bias people overestimate their knowledge, underestimate risk and exaggerate their ability to control events (Nofsinger, 2002). Svenson's (1981) 'better-than-average effect' is one of the most cited forms of overconfidence bias especially in stock markets. It originates from the observation that more than 50% of the investors seems to think that they can choose stocks better than the average trader. Other human beings who are subject to 'illusion of control' (Langer, 1975) believe that they can somehow exercise more control over market events such as buying hot stocks or avoiding poorly performing stocks than can realistically be possible. Thus, they are excessively optimistic about the future (i.e., unrealistic optimism [see e.g., Langer, 1975; and Langer and Roth, 1975]). However, most of the empirical literature on overconfidence bias prefers 'miscalibration' (see e.g., Keren, 1991; Lichtenstein *et al.*, 1982;

and McClelland and Bolger, 1994) to define and measure it. Moore and Healy (2008) suggest that 'confidence judgments' can be miscalibrated in three different ways. First, individual investors might be inaccurate in the precision of their judgment (i.e., over precision [see e.g., Kirchler and Maciejovsky, 2002]). Second, investors might be imprecise in the judgment of their own skills and abilities (i.e., absolute over- or under confidence [see e.g., Blavatskyy, 2009; and Taylor and Brown, 1988]). Third, investors might be biased in their judgment of themselves in relative terms to others (i.e., relative over- or under confidence [see e.g., Larrick *et al.*, 2007; and Moore and Small, 2007]).

Thus, overconfidence can be defined as the unmerited confidence in self's judgments and abilities. Odean (1998) explains overconfidence bias as the belief that an investor's information is more precise than it actually is. Daniel *et al.* (1998) define an overconfident investor as one who overestimates the precision of his private information signal, but not of information signals publicly received by all. In its simplest way, Sadi *et al.* (2011: 236) define overconfidence as - "an inopportune belief toward a witnessed reasoning, judgment and the person's cognitive abilities".

A vast behavioral finance literature identifies overconfidence bias as a key determinant of financial outcomes (Alpert and Raiffa, 1982; and Barberis and Thaler, 2003). Overconfidence is examined within various contexts and in relation to excessive trading volume (Barber and Odean, 2000; DeBondt and Thaler, 1995; Glaser *et al.*, 2007; Kim and Nofsinger, 2007; Odean, 1998; and Statman *et al.*, 2006); to the emergence of stock market bubbles (Daniel *et al.*, 1998; Michailova, 2010; Scheinkman and Xiong, 2003; and Shiller, 2002; 2003); to corporate investment decisions (Gervais *et al.*, 2003; and Malmendier and Tate, 2005); acceptance of stock options as compensation (Oyer and Schafer, 2005); to the predictability of market returns (Daniel *et al.*, 1998); and return decline (Garvey *et al.*, 2007; Hirshleifer, 2001; and Sehgal and Tripathi, 2009). However, these external markets related sources are not covered under this review.

Although its effects are many, the known determinants of overconfidence bias from the investor's viewpoints are few as cited in the existing literature. Investigation into the factors that explain overconfidence bias such as aspects of choice task (Malmendier and Tate, 2005); nature of such task (Hoelzl and Rustichini, 2005; Larrick *et al.*, 2007; Moore and Healy, 2008; and Moore and Small, 2007); greater information volume; interpretation of such information (Maital *et al.*, 1986); personality traits (Maital *et al.*, 1986; Schaefer *et al.*, 2004; etc.); expertise and gender (Barber and Odean, 2001; Lewellen *et al.*, 1977; and many others); return and risk (Maital *et al.*, 1986); etc. are among such factors examined in the literature. Graham *et al.* (2009) and Glaser *et al.* (2007) also report that the level of overconfidence bias in the domain of financial markets is different across individuals. Ivancevich *et al.* (2011) document that the major factors that influence individual differences in behavioral patterns are

demographic factors, abilities and skills, perception, attitudes and personality. However, there are varying opinions on whether overconfidence bias is induced by situational factors or whether it is a stable individual trait (Griffin and Varey, 1996).

Therefore, understanding of the sources and their stylized facts of overconfidence bias from individual investor's intrinsic standpoints is extremely important at the theoretical and practical levels. Understanding of the nature of overconfidence bias is also crucial to the studies of financial markets resulting in behavioral patterns and socio-economic interactions among agents. In fact, investor's behavior and investor's biases might explain the price puzzles which couldn't be solved by the standard financial theories. Moreover, analyzing the investor's psychology enhances stakeholders' knowledge of their investment decisions and trading activities and provides a deeper understanding of how markets work. The review results of this study can also help investors to minimize the negative impact of overconfidence bias and irrational decisions on their expected utility.

Thus, by following empirical literature on 'overconfidence bias', this study highlights the factors/drivers such as age and sex; education; social and cultural, economic and financial background/status; marital status; risk-perception and risk-taking abilities; personality characteristics/traits; short and long-term financial requirements and objectives; formal training, if any; necessary investment knowledge and skills; past experiences in terms of successes/failures; and access and interpretation of relevant information; etc. which drive the overconfidence in individual investors at different quantum. More specifically, this study aims at finding the sources from where overconfidence bias of investors develop and impact their behavior in stock markets.

2. Demography as a source of overconfidence

2.1. Empirical Review

There is ample evidence that certain individual demographic characteristics are correlated with overconfidence bias. Maccoby and Jacklin (1974) point out that there are few gender differences with respect to intellectual and academic ability, achievement motivation and self-esteem. However, they report that self-confidence is lower in women than in men. Psychological research establishes that men are more prone to overconfidence bias than women, particularly so in male-dominated realms such as finance. In one of the earliest studies, Lewellen *et al.* (1977) find that men have stronger tendency to overconfident behavior in comparison to woman (see also, Acker and Duck, 2008; Beyer, 1990; Chen *et al.*, 2007; Graham *et al.*, 2009; Hoffmann *et al.*, 2010; and Lin, 2011). This finding is supported by Barber and Odean (2001) in stock markets when they find that men are more active traders which imply

overconfidence bias. However, Deaves *et al.* (2004) do not corroborate this finding due to the fact that their female respondents are business students rather than belonging to a diverse group. Lenney (1977) view that the level of confidence expressed by women in comparison to men under their study appears to be situational dependent, and the type of task being undertaken is also relevant. He also argues that such gender differences in self-confidence depend only on the lack of clear and ambiguous feedback.

Using the same database as Barber and Odean (2001) undertakes, Korniotis and Kumar (2007) find that older investors have better knowledge about investing and hold less risky and more diversified portfolio. These results are consistent with Abreu and Mendes (2011) who finds that younger investors are more prone to take on risk and trade more (see Barber and Odean, 2001; and Dorn and Huberman, 2005; also). This implies that overconfidence bias decreases with age. Crawford and Stankov (1996); Hansson *et al.* (2008) and Job (1990) contradict by stating that overconfidence bias increases with age. However, Sandroni and Squintani (2004) find that overconfidence bias does not vanish with learning and experience with the age. Josephs *et al.* (1992) argue that low self-esteem individuals take less risk than individuals with high self-esteem. Blavatskyy (2008) also observe that confidence does not depend on their attitudes towards risk or ambiguity. Because, factors such as family, society, culture, peers and many other environmental factors influence the formation of attitude. Korniotis and Kumar (2007) also find that the negative age effect is less apparent in the group of individuals with higher education and higher income. Graham *et al.* (2009) find that wealthier and highly educated investors are more likely to perceive themselves as competent which implies overconfidence. They also find that investors who feel competent trade more often. This is because as Peress (2004) shows that wealthier investors value information more and poor investors trade little even with very precise information. However, Bhandari and Deaves (2006) find that highly-educated well-paid males are especially susceptible. Ekholm and Pasternack (2007) confirm that investors with smaller portfolios are more overconfident compared to investors with larger portfolios as these investors are more experienced and wealthier. DeBondt (1998) also find that affluent investors report about their stock-picking skills as most critical to portfolio performance. However, in reality they are unduly optimistic about the performance of the shares they pick and underestimate the effect of the overall market on their portfolio's performance.

Fan and Xiao (2005) and Statman (2010) find that individuals in different societies/cultures may have different behavioral biases which might affect their financial decisions differently. Chuang and Wang (2005); Chuang *et al.* (2010); Lee *et al.* (1995); Whitcomb *et al.* (1995); etc. prove that overconfidence bias differ from one culture to another. Acker and Duck (2008) find that Asian students are more overconfident than their British counterparts which

also imply that the level of overconfidence is generally different among cultures.

Many past studies such as Ben-David *et al.* (2007); Graham *et al.* (2009); Hackbarth (2009); Sadi *et al.* (2011) and Weinberg (2006) point out the importance of personality traits in making investors overconfident. Personality of individual investors is influenced by their respective heredity, family, society, culture and situations. Pittenger (1993) suggest that every person has innate preferences that define how he/she will behave in a certain situation. Weinberg (2006) also argue that a concern for self-image can lead to overconfidence bias. However, Burks *et al.* (2010) fully reject their claims that overconfidence bias is the driving force of self-image concerns. Rather they find contradictions in their model and predict - "More confident individuals are more likely to seek information". Thus, personality traits are closely interlinked with information signals gathering, processing and interpretation. Assuming that an individual investor in general should want to be as well informed as he/she can, personality characteristics can affect the information that he/she collects during his/her life. However, the fact is that all individuals should properly discount the fact that different individuals seek different information in forming their beliefs (see e.g., Pinto and Sobel, 2005).

Mood state of the investors might also influence confidence or accuracy and thereby overconfidence bias. Theoretically, mood might make certain information more easily accessed from memory and therefore this may bias the judgmental processes affecting accuracy or confidence. Mood might also influence the self-evaluation of the person and thereby alter confidence. Personality traits might also affect the way in which individual investor processes and interprets the same information and signal their opinions to the outside world. It can be subdued or overconfident or balanced.

In regard to their requirements and objectives, individual investor trades for liquidity needs in order to move to less or more risky investments and to realize tax losses or to rebalance. Odean (1999) controls for these effects and still finds statistically significant effect of investors' overconfidence. Barber and Odean (2000) also investigate whether trading is caused by rational expectations, and find that liquidity, risk-based rebalancing and reducing taxes only explain some of their trading activities, but are unable to explain the annual turnover of 250% for the most frequently trading households.

2.2. Stylized facts

Thus, gender does take an important role in individual investors' investment decisions. The male investors being active traders and aggressive in regard to risk-attitude and risk-taking abilities are much more overconfident that their female counterparts. However, their age also is very crucial in this regard. The experienced investors with a proper background and continuous learning exercises by active trading are much more balanced than their inexperienced

and younger peers. However, the income status and sound educational qualification also make investors logical and balanced, thereby mitigates overconfidence. The wealthier investors are generally much more precise in using the available information signals as they are investing/trading with their surplus funds. However, sometimes they ignore the overall market conditions rather overoptimistic about their own picks. The investors with small investments are generally much more overconfident than others. Cultural differences also may cause differences in individual biases as cognitive biases can be triggered or suppressed by different life experiences and cultural backgrounds. The individual investors' personality characteristics/traits are equally critical in moulding their confidence level to upper or lower bound. Generally sound investors are accurate and reliable information-seekers and interpret them without any bias. But, different personality traits might influence the choice of signal structure he/she uses (e.g., the information that he/she is gathering or he/she is paying attention to) among several incomparable ones. However, differences in information acquisition due to differences in such personality traits alone cannot explain one's overconfident judgments. As because there are many other characteristics such as mood-state, fear, greed, anger, etc. which might dominate the overconfidence bias. Lastly, the individual objectives or requirement patterns of individual investors might also cause to be overconfident or under confident or balanced.

3. Training, investment knowledge and skills as a source of overconfidence

3.1. Empirical Review

Investors' skill can be defined as the ability to act in a way that allows a person to perform well. Generally, investment skills are developed with proper training and continuous practice with investment knowledge in the background. Glaser *et al.* (2007) find that professionals are more overconfident than students about their trend recognition abilities although they do not provide more accurate estimation. Russo and Schoemaker (1992) in an interesting observation suggest that overconfidence bias informs people of individual's meta knowledge which - "concerns a higher level of expertise: understanding the nature, scope, and limits of our basic or primary knowledge". The implication of meta knowledge on investment decision-making is based on the notion that individuals draw from it when they are sanguine that they have enough information to make a profitable decision in the present moment. However, generally overconfidence bias arises when knowledge perception exceeds its reality and thereby investors make mistakes and suffer losses. Many empirical studies (see e.g., Budescu *et al.* 1997; Harvey 1997; Lichtenstein *et al.* 1982; and McClelland and Bolger 1994) report that people are systematically overconfident about the accuracy of their knowledge and judgment. Keasey and Watson (1989) identify four factors as drivers of

the accuracy-confidence relationship - the complexity of the task, amount of feedback given, motivation level of the respondents and skill of them.

People like to think that they are intelligent and knowledgeable and they might have reasons for wanting a particular answer to be true (see e.g., Kunda 1990; Langer 1975; and Larrick 1993). Paese and Sniezek (1991) propose that if respondents make a decision based on their judgments, their subsequent confidence would be higher due to increased commitment in their answer. However, overconfidence bias also drops significantly when such a decision precedes the confidence rating of the judgment. Motivational factors can also exacerbate this bias. Lichtenstein *et al.* (1982) comment that there might be times when people are not motivated to be honest in their assessments of confidence, as situations may reward or punish honesty differentially. Thus, subtle pressures to conform, impress or deny might be strong reasons to be miscalibrated in one's judgments. However, the extent to which overconfidence occurs seems to depend very much on the difficulty of the judgment task. Overconfidence seems to disappear or under confidence is observed in easy tasks. But, with hard tasks, overconfidence seems to be rampant. Gigerenzer *et al.* (1991) observe - "The hard-easy effect occurs when the degree of overconfidence increases with the difficulty of the questions, where the difficulty is measured by the percentage of correct answers". However, till today, it remains controversial whether the observed correlation between difficulty and overconfidence can be fully explained by the effects of unbiased imperfections in judgment (see Juslin *et al.*, 1997). The role of unbiased judgmental errors in producing overconfidence bias is studied by many. Such errors arise from the learning imperfections in the predictive validity of different sources of information (Gigerenzer *et al.*, 1991; and Soll, 1996); in evaluating the available information (Erev *et al.*, 1994); and in mapping investors' subjective feelings of confidence to a response scale (Erev *et al.*, 1994; and Ferrell, 1994). However, empirical literature (see e.g., Harvey 1997; and Soll 1996) suggests that none of these explanations assumes judgments to be systematically biased, rather only that they are imperfect.

Also, overconfidence bias occurs when a decision makers' beliefs about the quality of his/her performance exceeds actual performance (Stone, 1994). Tourani-Rad and Kirkby (2005) examine optimistic and overconfident investors in New Zealand who believe they have investment ability and knowledge to understand the latest market trends or select the next hot stocks. However, Blavatskyy (2008) shows that the investors exhibit average confidence in their own knowledge. Miller and Ross (1975) and Kunda (1987) find that investors attribute successful investment results to their skills but blame their bad lucks for failures. This is discussed under the 'Self-attribution bias' in the literature.

3.2. Stylized facts

It is quite obvious that the professional investors/traders are much more overconfident that the amateur people. This is due to their formal training,

expertise, requisite skills and domain knowledge. Generally they are overconfident about their knowledge, though in reality it does not persist. This is evident as many of the times their forecasting of the markets is not accurate. Committing oneself to a decision for fulfilling self-objectives also tempers high confidence, possibly through the accountability factor. It thus implies that they tend to express confidence in their judgments that exceeds the accuracy of those judgments. However, the difficulty-level of the judgment task is also taken into consideration in evaluating this overconfidence bias. Though it is unclear whether the 'hard-easy effect' has any implication in driving investors' confidence up or down, but generally people become overconfident in hard tasks which are difficult for many others to undertake. This is due to the fact that they are overconfident about their knowledge, their predictive abilities, and collective and evaluative skills of accurate information signals. Overconfidence bias might also occur from investors' self-belief about the quality and results of their actual investment performance. However, as per the 'self-attribution bias', they sometimes attribute their success to their skills, but the failures to bad lucks.

4. Past experiences and successes/failures as a source of overconfidence

4.1. Empirical Review

Nicolasi *et al.* (2004) suggest that irrational behavior diminishes substantially with investors' trading experience. The behavioral finance literature (see e.g., Gervais and Odean, 1999; Nicolosi *et al.*, 2009; etc.) studies in detail the relation between trading experience and the degree of overconfidence bias of the investors. It suggests that investors are more likely to be overconfident when they are less experienced as they learn about their true ability through experience (Barber and Odean, 2001; and Gervais and Odean, 2001). The 'learning effect' (see e.g., Coursey *et al.*, 1987; and Dhar and Zhu, 2006) influence pull down the psychological biases of the investors with more and more trading experience. The studies of Christoffersen and Sarkissian (2002) and Locke and Mann (2001) also show evidence that overconfidence bias of investors indeed decreases with experience. Thus, inexperienced investors are more likely to be overconfident in their investment decisions. However, Kirchler and Maciejovsky (2002) and Sandroni and Squintani (2004) deny this fact. Griffin and Tversky (1992); Frascara (1999); and Koehler *et al.* (2002) also find greater overconfidence bias for tasks which respondents considered they have more expertise in. Glaser *et al.* (2005; 2007) also find that professional traders usually have a higher level of overconfidence bias than students. Many other past studies such as Ben-David *et al.* (2007); Graham *et al.* (2009) and Hackbarth (2009) also point out the importance of experience in making investors overconfident. However, Menkhoff *et al.* (2006) provide a mixed evidence of the issue saying that the results depend on the way one measures experience.

Forbes and Kara (2010) argue that individual investors' confidence mediates how investment financial knowledge influences investors' trading efficacy. On the other hand, Kirchler's (2010) experimental results show that the persistent underperformance of weak informed investors is not due to overconfidence. Rather, the overconfidence bias usually happens when investors taste a few easy successful past investments. Gervais and Odean (2001) also suggest that past successes increase overconfidence of the investors. As discussed by Svenson (1981), 'better than average effect' implies that people think they have superior abilities than the average ones. Thus, investors' overconfidence most often than not is under their belief that they are better and wiser than others in choosing investments than they actually is. However, this might lead to a complete disaster as DeBondt and Thaler (1985) find that there is a tendency of past winners to face loss to become future losers and vice versa.

Thus, the cognitive process of perception meant for interpreting the environmental stimuli in a meaningful way is extremely essential to mitigate any type of confidence misbalance among the investors/traders. As Dawes (1980) proposes that people overestimate their intellectual capacities, but are more accurately calibrated when perceptual tasks are concerned. It might be that people do not trust perceptual information, that motivational factors reduce confidence in perceptual tasks or that no high-level processing is required at which point errors can occur. Working in tandem, self-attribution bias leads investors to remember their successes with great clarity, if not embellishment (Fischoff, 1982; Langer and Roth, 1975; and Taylor and Brown, 1988). Also, the confirmatory bias - the tendency to search out evidence consistent with one's prior beliefs and to ignore conflicting data, might also contribute (Forsythe *et al.*, 1992).

4.2. Stylized facts

One of the interesting look out is the relationship in between trading experience and volume. Similar with investors' age (i.e., more experience) and overconfidence, higher and more trading experience in the stock markets pull down the overconfidence bias. Thus, the 'learning effect' implies that overconfidence decreases with continuous learning through active age-old trading experiences. The professional investors due to this are much more overconfident in their expertise and on their successes. Sometimes amateur investors are also become overconfident after tasting few early successes. They generally don't realize that they might be just lucky those few times. Instead, they start believing themselves and think they have the capacity better than others in selecting winning investments. This develops the 'better-than-average effect' and makes them overconfident about their investment knowledge, skills and trading patterns. Based on this, they invest/trade more, and these higher volumes in the stock markets make them suffer losses ultimately. So, clarity in

self-perception is vital to maintain balance in the confidence-level. The biases of 'self-attribution' and 'confirmatory' can help the overconfident investors in this endeavor.

5. Information as a source of overconfidence

5.1. Empirical Review

Empirical finance literature suggests strong and positive association between the frequency of individual investors' trading and the fundamental and financial information they collect. Investors who invest more time in information receive more signals and could therefore be expected to trade more frequently. The amount, source, value, timing and interpretation of information signals are extremely vital in investors' overconfidence bias.

Most studies find that in investment decision making tasks, confidence increases with the amount of information (Koriat *et al.*, 1980; and Oskamp, 1965) and the strength (Koriat *et al.*, 1980) of it. However, Peterson and Pitz (1986) contradictorily find that higher amount of information given to respondents reduce overconfidence, because it increases accuracy. But, Dreman (1979) concludes that an increase in information volume only increases the investors and advisors' overconfidence in their own ability to predict a company's stock performance at the expense of a declining accuracy prediction.

Zacharakis and Shepherd (2001) also find that as more information becomes available, people tend to believe they would make better and more informed decisions. It is also a well established fact that many people have a tendency to overestimate the precision of their information (see e.g., Lichtenstein *et al.*, 1982; and Russo and Schoemaker, 1992). As a result, investors overreact to private information and under react to public information.

Guiso and Jappelli (2006: 8) claim that - "overconfident investors are less willing to rely on information provided by financial advisors, banks or brokers and [are] more likely to collect information directly". Thus, they would collect information on the stock markets and stocks directly from specialized sources. Additionally, it can also be argued that if investors get financial advice from professionals then this would lead to a better self-evaluation of their own skills and more rational investment decisions (Fisher and Gerhardt, 2007). In fact, the value of information increases with the amount invested and the risk of the portfolio; investors acquire more information, it increases the precision of their signals and induces more informed individuals to hold more stocks (Peress, 2004). The timing and interpretation of information (discussed earlier) also play a crucial role in making investors overconfident.

5.2. Stylized facts

As discussed under several heads information and its signals are critical in investors' overconfidence. Generally higher volume of information enhances

investors' overconfidence, but the quality and strength of these do matter. The accuracy-confidence relationship is important in this regard. Investors also overreact to their private information which implies over precision and they generally under react to public information signals. So, they have much more belief on their own information collection and interpretation rather than their professional counterparts. Enhancement in the value of information signals does have a peer-effect on other investors which induces more and more informed investors to flock in the stock markets.

6. Conclusion

Although the notion of overconfidence has been challenged in empirical literature due to weak research methodology and experimental design, and rational information processing such as Bayesian updating rather than biased self-evaluations (e.g., Benoît and Dubra, 2009), many (see e.g., Merkle and Weber, 2011) find empirical support suggesting that overconfidence is indeed - "the consequence of a psychological bias". Thus, it is acknowledged that overconfidence bias is considered among the behavioral biases most readily accepted by economic and finance researchers. May (1991) also point out several problems with this area of research, such as item selection, forced scale use, differences in singular and frequentistic judgments and normative ambiguity of calibration. A strict efficient markets view of the world would argue that those fooling themselves in this overconfident way would ultimately be driven out from the marketplace, but some also have called this into question (Hirshleifer and Luo, 2001).

Amidst all these problems and issues in mind, this study finds the intrinsic sources of investors' overconfidence bias by an exhaustive review of the available empirical literature. The demographic and personality characteristics stand out as the most influencing ones to drive the behavioral bias of overconfidence of the investors. The personality traits are closely associated with the self-confidence in terms of their investment knowledge, skills and trading activity. Such an overconfident approach creeps in with trading experience and continuous successes in terms of their investment performance. It is logical to think that if they recall their successes and failures equally clearly, over time they should obtain an accurate view of the information signals. Thus, experience would make them wiser and perfect. The over justification and over precision of collected private information should also be avoided by balanced investors. However, they would also give due importance to the markets, their returns and available public information. These external sources of overconfidence bias for investors are not studied here which in itself a limitation of this study. However, the prevalence and persistence of overconfidence bias suggest that forces able to eliminate it are weak.

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