I J A B E R, Vol. 14, No. 3, (2016): 1515-1529

DOES THE PROPENSITY OF OVERCONFIDENCE BIAS HINGE ON DEMOGRAPHICS AND PERSONALITY TRAITS?

N. Chidambaram[*] and P. Vikkraman[**]

Abstract: *Svenson (1981) noted that a large number of people overestimate their driving ability. In the world of investment this type of attitude may cause serious harm to an investor's wealth maximization process. Departure from rational decision making has become the order of the day. To buttress Svenson, presently emotions, and not logic, rule investment decisions. Emotional bias, Cognitive bias and Contextual bias are causing havoc and ultimately the financial decisions taken are not in their best interests. One such bias in cognitive category viz "Overconfidence" is taken for an empirical testing in this study. This study attempts to investigate the existence of overconfidence bias and its impact on investors by grouping them as equity investors (read as proprietary traders - one who undertakes equity trading only on own account) and non-equity investors (One who invests in any investment avenues excluding equity). Further, how an investor's personality traits and demographic profile affects the overconfidence bias is verified. The primary data on these two diverse populations were collected through a structured questionnaire and appropriate statistical techniques were applied. Six hypotheses were constructed and concluded that no relationship exists between age, annual income with overconfidence except the investing experience in case of equity investors. The said relationship between demographic variables and overconfidence bias is affirmed in case of non-equity investors. Pearson correlation coefficient found a significant relationship between personality traits and overconfidence bias in equity investor's case. On the other hand, it was inferred that non-equity investor's personality traits do not have any association with overconfidence bias.A reasonable concordance has emerged from the testing of both samples that the correlation coefficient of 'neuroticism',the only personality trait having more impact on overconfidence bias. However, it was concluded that personality traits of diverse samples of this study are not that much capable of predicting overconfidence bias.*

Keywords: *Overconfidence, Personality Traits, Demographics*

* Assistant Professor (Sr), Department of Management Studies, SNS College of Engineering, Coimbatore – 641 107

** Associate Professor & Academic Director, Department of Management Studies, Anna University, Coimbatore – 640 046

1. INTRODUCTION

Too many people overvalue what they are not and undervalue what they are–

—Malcolm S. Forbes

People do not behave rationally at all times and show systematic departure from rational behaviour. According to Svenson (1981) a large number of people overestimate their driving ability than to underestimate. Contracting this, economic models assume that people are risk-averse by nature and value present consumption more than future. (Loewenstein, George 1992). Recent studies by behavioral psychologists have revealed how systematically people have departed from the optimal judgment and decision-making.

Human tendency is to resist any kind of change. In the world of investing, reluctant to adhere the financial discipline may lead one susceptible to plethora of investing biases. It is the root cause for an unjustifiable, irrational behaviour resulting in noise-trading, following trends, Over-reacting to good and bad news, generating unwarranted losses, achieving returns-below-than expected, under-diversification and decisional paralysis. This proclivity can inflict long-term damage and might nullify the process of wealth creation. Not only lay investors are the victims of these typical financial behavioral patterns but also financial advisors and professional money managers. In this regard, multiple researchers have indicated that there is a significant deviation of investors from Rational Economic Man (REM) to Behaviorally Biased Man. Their decisions were dominated by emotional characteristics like Fear, Greed, Hope against hope etc.

It is unfortunate that emotions, and not logic, rule the investment decisions. Though a contradiction with the utility theory of Economics, this type of behaviour is the reality. Market journey has its own ups and downs. In fact, many empirical findings across the Globe claim that the factors responsible for such swings are not only rational anticipations and reactions of market participants but also due to emotion. Collectively in financial literature the positive and negative impact of them is referred to as "Investment Bias". No doubt, these psychological biases can cloud rational thinking. Therefore, Michael Dowling & Brian Lucey in their undated study observed that good investors should recognize seven deadly sins like trading too much (Sloth), Investing based on image (Lust), following the crowd (Envy), not diversifying (Anger), Knowing best (Pride), following share price trends (Greed) and ignoring the lessons of history (Gluttony).

Behavioral finance, as a body of knowledge deliberately attempts to know the reasons for the above with cognitive psychology and conventional economic principles. Overcoming these extreme emotions is paramount for wealth creation.

On average investors who succumbed to the behavioral biases become systematic. Hence the possibility of exploring its impact and prediction is there.

Belsky and Gilovich (1999) in their research pointed that overconfidence is pervasive. Overconfidence is the propensity for people to overestimate their knowledge, cognitive abilities and the precision of their information (Bhandari &Deaves, 2006). With this background and curiosity, this paper aims to investigate whether and how overconfidence bias affects equity investor (read as a proprietary trader who does equity trading only on own account) and non-equity investors. Further, how an investor's personality traits and demographic profile affects the overconfidence bias is verified. It also testifies whether psychological issues are driving and determining economic issues. Such a test is the primary contribution of this paper.

Brokerage traders are purposefully overlooked from this study as their motive and expected incentives are typical. No significant difference is observed between an investor & trader and hence these two terminologies were used interchangeably throughout this study by the researcher although there is a marginal difference. Despite the long list of judgmental errors affecting traders this study has restricted itself only to overconfidence bias and is presented in brief. Results of this study could help the financial intermediaries to have an insight on the degree of overconfidence bias and the extent of impact of demographic variables and personality traits on overconfidence. Further this could facilitate the financial intermediaries to profile their prospective clients based on which a timely and better advise be offered to them.

Following is the structure adopted to present the contents. Section II provides the literature background on individual investor overconfidence and personality traits. In Section III, we have explained the data methodology. Results are reported in Section IV and conclusion arrived at listed in Section V.

II. LITERATURE REVIEW

Emotions

Emotions have powerful effects on decisions, and decision outcomes have powerful effects on emotions (Mellers 1998). Emotions can have either pre-decision or post-decision impact yielding both positive and negative outcomes.

Bias

Biasis defined by HershShefrin as nothing else but an inclination towards error. A departure from optimal or rational behaviour. This biased behaviour influences rational decision making abilities.

Overconfidence

Overconfidence is a state of over estimating or exaggerating one's ability to perform the task. It causes an investor to be too certain about their own opinions and to

undermine the opinion of others. They perceive their actions are less risky and hence overestimate the precision of knowledge. (Fischoff, Slovic and Lichtenstein (1977). Hence they do persistent trading. Such an overconfident trait was also exhibited by other professionals like Engineers (Kidd, 1970), Entrepreneurs (Cooper, Folta, and Woo (1995), Investment Bankers, Lawyers in various studies. *Illusion of knowledge* and *Illusion of control* are the two prime reasons for overconfidence.

Wen-I Chuanga, Raul Susmel (2010) provided extensive evidence that both individual and institutional investors tend to trade more aggressively after market gains during bull markets, up-state markets, and up-momentum market states and that only individual investors trade more in riskier securities after market gains. Their study concluded that individual investors display more significant overconfident trading behavior than institutional investors. These findings are consistent with Gervais and Odean's (2001) argument that inexperienced, individual investors tend to be more overconfident traders than experienced institutional investors. Opinion polls reveal that mostly amateur investors are overconfident than their counterparts. Overconfident investors hold riskier portfolios than rational investors (Odean, 1998). Both men and women exhibit overconfidence, men are generally more overconfident than women (Lundeberg, Fox, and Puncochar, 1994 & Brad Barber and Terrace Odean, 2001). At the same time, men lower their returns due to excessive trading than women (Brad Barber and Terrace Odean, 2001). Grinblatt and Keloharju (2009) pointed in their study that overconfident investors are most prone to sensation-seeking trade. Daniel.K, Hirshleifer.D and Subrahmanyam.A.(2001) evidenced that overconfident investors are ignoring systematic indicators at the cost of misguided convictions of mispricing measures during bull markets. Eva I.Hoppe and David J.Kusterer (2010) have found that their subjects with higher Cognitive Reflective Test (CRT) scores are more precise in self-assessment.

Ronald Huisman, Nico L. van der Sar and RemcoC.J. Zwinkels, (2010) examined the presence of overconfidence in the clients of a large Dutch bank by applying the Parkinson volatility estimate based on highest and lowest bounds around the Amsterdam Exchange (AEX) stock index forecast. Empirical results were obtained using the AEX index options' implied volatility as a volatility benchmark to conclude that retail investors exhibit a significant overconfidence bias. Yenshan Hsu and Cheng-Yi Shiu. (2007) affirmed that overconfident bidders are actively participating in the IPO auctions as they overestimate the value of their private information, causing them to bid too aggressively to earn below-average returns.Hoang Thanh Hue Ton and TrungKien Dao. (2014) in an empirical study examined the impact of five factors of psychology viz overconfidence, optimism, herd behavior, psychology of risk and pessimistic on investments decisions and concluded overconfidence is having a negative impact.

Big Five Inventory (BFI)

Personality refers to a set of distinctive personal characteristics, including motives, emotions, values, interests, attitudes, and competencies. Adopted BFI model (John.O.P, Donahue. E. M. and Kentle. R. L. 1991) to measure the personality taxonomy for this study categorizes personality traits, in its literature, as follows:

1. Extraversion
2. Agreeableness
3. Conscientiousness
4. Neuroticism
5. Openness

A short description of Big Five Inventory

Personality Trait	*Description for High Scores*	*Description for Low Scores*
Extraversion	Assertive, Dominant, Energetic, Talkative	Introverted
Openness	Creativity, Innovativeness, Curiosity and Open to new ideas	Traditional and Conservative. Prefers continuity over change
Agreeableness	Cooperative, Forgiving and Trusting	Mildly suspicious of others intentions, Critical
Conscientiousness	Achievement oriented, Hard-working, Diligence, Self-disciplined	Impulsive and Disorganized
Neuroticism	Tenseness, Anxious, Irritable	Calm, Relaxed and Indecisive

(*Source:* A compilation by the Author)

Several studies have examined all the plausible impact of personality traits on financial decisions. Henrik Cronqvist and Stephan Siegely (2012) showed empirical evidence that genetic factors explain up to 50 % of the bias variation in people. Further it was proved that education does not help to reduce the genetic pre-disposition towards investment biases.

Type A personality are more willing to take higher levels of risk than Type B individuals (Carducci. B.J & Wong. A.S. 1998). Cliff Mayfield, Grady Perdue and Kevin Wooten (2008) revealed that more extraverted individuals intend to engage in short-term investing, while those who are higher in neuroticism and/or risk aversion avoid this activity. Risk adverse individuals also do not engage in long-term investing. E.R.Stone.C.L.Dodrill, and N.Johnson (2001) inferred a negative relationship between neuroticism and overconfidence. In addition P.S.Schaefer, C.C.Williams, A.S.Goodie and W.K.Campbel (2004) found that the trait of extraversion was negatively associated with overconfidence. Huei-Wen Lin (2011)

evidenced that investors with the trait of conscientiousness are more careful than other investors on investment. This makes them feel more confident on themselves and leads to overconfidence bias. A study by Samson YimkaAlalade, Ignatius Ekene Okonkwo and Nathaniel A. Folarin (2014) found the presence of behavioral biases in Nigerian stock market. This result was almost in line with AbiolaAyopoBabajide and KehindeAdekunleAdetiloye. (2012) study that there is a presence of behavioral bias but not noticeably dominant. According to Graham, Harvey and Huang (2009) wealthier and highly educated investors are more likely to perceive themselves as competent, implying overconfidence. Whereas Ekholm and Pasternack (2007) confirmed that investors with smaller portfolios are more overconfident than their counterparts. Dr.Taqqadus Bashir, Umaira Rasheed, SundasRaftar, Saliha Fatima and MaimonaMaqsood. (2013) analyzed the select samples of students and employees and concluded that there is no significant difference between the responses of male and female decision making regarding overconfidence bias.

JekaterinaKartašova. (2013) deduced from Lithuanian individual investors that older women investors particularly those with economist & financier background having an investment experience of more than 5 years are very much prone to overconfidence bias. A study on Jordanian investors by Ala'a M. Al-Horani and Fayez Haddad. (2011) disclosed that 40% and 36% of them are overconfident during the process of transmitting trade orders for stock and while talking about future expectations respectively. Another research on Jordanian investors by Dima W.Alrabadi, Mohammad.A. AL-Gharaibeh and ZiadM.Zurigat. (2011) through a stepwise regression analysis proved that experience is the only factor that significantly increases overconfidence. Markus Glaser, Thomas Langer and Martin Weber. (2005) examined both professional traders and students to know that professional's judgments are biased. Accelerated feedback, Counter argumentation, Preparation of fault-tree, Paths to future and Awareness are the five cognitive remedies for overconfidence as recommended by J Edward Russo and Paul J H Schoemaker (1992).

III. DATA AND METHODOLOGY

Data Collection

Individual investors dealing with equity on proprietary basis and non-equity investors are the targeted subjects for this study. The primary data was collected with a view to understand and measure whether notable personality differences exist between them, in causing overconfidence bias, through a structured questionnaire with closed-ended questions.

Questionnaire Design

This exploratory study aimed to capture the propensity of overconfidence in the minds of investors with three parts. First part includes the questions on demographic factors of the respondents like gender, age, marital status, educational background, annual income and experience in investing (Questions 1 – 6). Second part includes questions to measure the overconfidence anomaly adapted from the well-known behavioural finance expert Michael Pompian's certainty overconfidence bias test from "Behavioral Finance and Wealth Management" (Questions 7 – 14). This part includes a total of eight questions to know the 'Predictive ability' of the respondent and 'Certainty' aspect of overconfidence in them. Big Five Inventory (BFI) questionnaire by John.O.P, Donahue. E.M, &Kentle. R.L. (1991) - versions 4a and 54 was included in the last part of the questionnaire to measure the respondent's personality traits. Responses to the BFI questionnaire are assessed through a five-point likert scale ranging from Disagree Strongly to Agree Strongly. All negatively worded constructs are appropriately re-coded. Ultimately the subjects' personality traits were determined on the basis of given scoring instructions.

Sample Description

The population of the study (139) is comprised of investors availing financial advisory services from a leading, corporatized firm located at Coimbatore, India. Extant survey literature on behavioural biases as a mainstream, focused on the impact of demographic profile and personality traits on overconfidence bias using a single population, whereas this study considered two different populations, but doing the same task of investing. Proceeding with caution, populationfor this study is identified having a wide investment interest on both equity and non-equity avenues. In the opinion of researcher non-equity investors are those who invest in all prospective avenues excluding equity shares (stock). Based on such a diverse population, a sample of 103 was arrived at by splitting 52 for equity traders and 51 for non-equity category to represent a distinct view by adopting Taro Yamane sampling formula. Quota sampling method was used.

Structured questionnaires were distributed to elicit responses via on-line and off-line methods. Participation in this survey was absolutely voluntary and no compensation has been offered. On an average, it took a time frame of 10-15 minutes for completion.

Data Analysis Techniques

Collected data of this study was analysed using IBM Statistical Package for Social Sciences (SPSS) 19.0. Sixhypotheses are tested in this paper by using relevant

statistical techniques like Chi-square and Pearson correlation and Regression. Data validity and reliability was ensured through Chronbach's Alpha computation and K-S test was performed to test the data normality before doing parametric tests.

Hypothesis

The following hypotheses were formulated and tested at 5% level of significance to study the intended research objectives. The independent variables of the study included age, annual income and investing experience. The dependent variables were overconfidence scores and personality trait scores.

Hypothesis H_1: There is a relationship between demographic variables and overconfidence bias in equity investors.

Hypothesis H_2: There is a relationship between demographic variables and overconfidence bias in non-equity investors.

Hypothesis H_3: There is a relationship between equity investor's personality traits and overconfidence bias.

Hypothesis H_4: There is a relationship between non-equity investor's personality traits and overconfidence bias.

Hypothesis H_5: A personality trait of an equity investor predicts overconfidence bias.

Hypothesis H_6: A personality trait of a non-equity investor predicts overconfidence bias.

Validity and Reliability of Data

Variables such as overconfidence and personality trait scores were subjected to the test of validity and reliability. Chronbach's coefficient scales for equity investor's confidence is 0.556 and 0.672 for personality score& it is 0.561 and 0.541 respectively for non-equity investors.

Tests of Normality

In order to apply the aforesaid parametric tests mentioned in data analysis techniques Kolmogorov-Smirnov statistic is applied on the scores of personality traits to have a non-significant result, indicating normality. As required the data has fulfilled the norms of normality and hence it was concluded to proceed with parametric tests. Results are shown in the following table.

Table 1
Tests of Normality - Kolmogorov-Smirnov

Sample category		*Extraversion*	*Agreeable-ness*	*Conscientious-ness*	*Neuroticism*	*Openness*
Equity Investor	Statistic	.604	1.206	.908	.819	.895
(df:52)	Sig.	.856	.106	.376	.511	.394
Non-Equity	Statistic	1.023	.909	.769	.812	.721
Investor (df:51)	Sig.	.244	.381	.598	.521	.673

Theoretical Framework

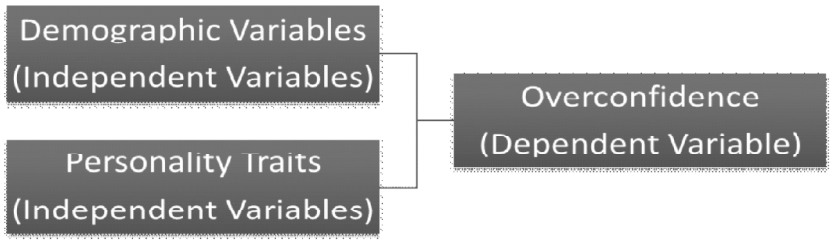

Figure 1: Theoretical Framework

IV. DATA ANALYSIS & EMPIRICAL RESULTS

This study is based on the samples drawn from a diverse population with a gender break up of 69.90% male and 30.10% female. Of the total sample size 75.73% constituted the less than 50 years age group and the remaining towards more than 50 years age. In terms of annual income 52.43% comprised the group having an annual income of less than Rs.5 lakhs and the rest is categorised having an annual income of more than the earlier ceiling. 69.90% of the sample had an investing experience of less than five years.

Testing of Hypothesis H_1

With a view to test H_1categorical, demographic factors such as age, investing experience and annual income were taken and the results are tabulated.

Table 2
Chi-Square Tests between Demographic variables and Overconfidence of Equity investor

Demographic Variables	*Pearson Chi square Value*	*Df*	*Asymp. Sig.*
Age	14.210	3	.423
Investing Experience	27.39	4	.001
Annual Income	4.220	4	.876

Significant value for age and annual income is >.05 and hence null hypothesis is not rejected. Statistically, $\chi^2$for age (3) = 14.210, p = .423 and χ2 for annual income (4) = 4.220, p = .876. Therefore, norelationship exists between demographic variables (age and annual income) and overconfidence bias in equity investors. χ^2 for investing experience (4) = 27.39, p = .001 indicates a significant relationship. Hence higher the level of investing experience, greater is the level of overconfidence bias.

Testing of Hypothesis H_2

Table 3
Chi-Square Tests between Demographic variables and Overconfidence of Non-Equity investor

Demographic Variables	*Pearson Chi square Value*	*Df*	*Asymp. Sig.*
Age	21.339	3	.001
Investing Experience	25.40	4	.001
Annual Income	3.232	4	.010

The above table indicates a significant relationship between a non-equity investor's age and overconfidence bias with a chi-square value of 21.339, $p<.05$. Investing experience and annual income also having a significant value, $p<0.5$ concludes that there exists a significant relationship. Therefore, in case of non-equity investors all considered demographic variables are having a significant relationship with that of overconfidence bias which leads to the rejection of null hypothesis.

Testing of Hypothesis H_3

In view of testing the remaining two hypotheses Pearson product-moment correlation is used as the variables in consideration supports the required quality data type.

Table 4
Pearson correlation between Investor's personality traits and overconfidence bias for equity investors

Personality Trait	*Pearson Correlation Co-efficient*	*Level of Significance*	*Direction of Correlation*	*Strength of Correlation#*
Extraversion	.511**	.000	Positive	Strong
Openness	.490**	.001	Positive	Medium
Agreeableness	.562**	.000	Positive	Strong
Conscientiousness	.500**	.000	Positive	Strong
Neuroticism	.623**	.000	Positive	Strong

** Correlation is significant at 0.01 level. # Based on Cohen (1988) guidelines

Personality traits listed in Table 4 reveals a significant correlation with overconfidence bias. Hence, null hypothesis is rejected. It is noteworthy to point that all personality traits are capable of influencing an equity investor's overconfidence at strong level except the openness trait. Shared variance values of extraversion, openness, agreeableness, conscientiousness and neuroticism helps to explain nearly 26.11%, 24.01%, 31.58%, 25.00% and 38.81% respectively of the variance in investor's personality traits score on overconfidence bias.

Testing of Hypothesis H_4

Table 5
Pearson correlation between Investor's personality traits and overconfidence bias for non-equity investors

Personality Trait	*Pearson Correlation Co-efficient*	*Level of Significance*	*Direction of Correlation*	*Strength of Correlation#*
Extraversion	.231**	.122	Positive	Small
Openness	.179**	.170	Positive	Small
Agreeableness	.150**	.285	Positive	Small
Conscientiousness	.108**	.428	Positive	Small
Neuroticism	.302**	.303	Positive	Medium

** Correlation is significant at 0.01 level. # Based on Cohen (1988) guidelines

Personality traits listed in Table 5 reveals the absence of strong correlation with overconfidence bias. Hence, null hypothesis is not rejected. All personality traits are capable of influencing a non-equity investor's overconfidence only at a smaller level except the neuroticism. Shared variance values of extraversion, openness, agreeableness, conscientiousness and neuroticism helps to explain nearly 5.34%, 3.20%, 2.25%, 1.17% and 9.12% respectively of the variance in investor's personality traits score on overconfidence bias.

The computed Pearson product moment correlation for two diverse populations has disclosed a typical result. In case of equity investors personality traits have got a significant impact whereas it is not having a significant impact for non-equity investors. Further, openness trait causes an equity investor to be less confident. Probable reason for this could be that their openness attitude may bring out all of their nuances in limelight which may ultimately weaken their stand. Despite the reality of neuroticism in non-equity investor predicts only 9.12% of overconfidence bias (38.81% in case of equity investor) it is the only trait having a higher correlation over others. Probably the revealed higher emotional stability in them may make them much prone to overconfidence bias.

Regression

A simple linear regression model is tested to investigate whether there is a linear relationship between two quantitative variables viz personality traits and overconfidence bias. In other words, we want to fit a model for predicting the values of the dependent variable (DV) from one or more independent variables (IVs). It takes the form $y = \alpha + \beta x + e$, where y is the dependent variable, in this case overconfidence (DV), x is the explanatory (IV) variable, which will be personality traits, α is the intercept term of the model, β is the gradient of the linear model and *e* is the error term. Adopted notations for personality traits are Extraversion (E), Openness (O), Agreeableness (A), Conscientiousness (C) and Neuroticism (N).

Testing of Hypothesis H_5

The following regression model has been fitted to predict the overconfidence in equity investor:

Overconfidence = a + bE + cO + dA + eC + fN (Eq…1) which is substituted as

9.339+0.186E+0.110O+0.211A+0.031C+0.461N

*T-statistic*test was applied to test the value of *b* is 0. In case if *b*-value is significantly different from 0, we can conclude that the predictor variable contributes significantly to our ability to estimate values of the outcome. T-values for personality traits are (1.701) (0.888) (0.480) (0.850) (0.153) (2.199) and their respective sig values are (.093) (.375) (.621) (.391) (.887) (.031). All T-values are < 1.96 indicates that none of the independent variable taken for this model fit is capable of predicting the dependent variable except 'Neuroticism'. It is meaningful to recall that this result was already confirmed by correlation analysis explaining around 38.81% of variation in overconfidence bias than any other variable. Therefore, regression test fails either to support or oppose the null hypothesis.

Testing of Hypothesis H_6

By substituting the regression coefficient values for non-equity traders in equation 1, we get

25.131+0.170E-0.433O-0.140A-0.098C+0.163N

T-values for personality traits are (3.721) (0.667) (1.877) (0.677) (0.387) (0.666) and their respective sig values are (.001) (0.519) (0.070) (0.588) (0.687) (0.508). As all T-values are < 1.96 and Sig values are <0.05, none of the independent variable taken for this model fit is capable of predicting the dependent variable. Hence in this category of sample also regression test fails to either support or oppose the

null hypothesis. Therefore the researcher was unable to predict non-equity investor's inclination toward overconfidence bias, based on their personality traits.

V. CONCLUSION

Overall, the study findings reveal the impact of demographic profile & personality traits of equity and non-equity investors on overconfidence bias on a different scale. Being aware of overconfidence biasis the best way to devoid its impact on decision making process.Masomi.S.R, &Ghayekhloo.S. (2011) indicated that the findings of a study should be interpreted carefully by acknowledging the difference in demographic, cultural and social factors of the respondents as they shape investor's psyche.

Acknowledgments

We thank sincerely captain saravanan for his comments. All remaining errors are our own.

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