AR&P sciendo

Financial Markets, Institutions and Risks, Volume 7, Issue 3, 2023
ISSN (online) – 2521-1242; ISSN (print) – 2521-1250

Sumy State University

Impact of Automation Bias and Status Quo Bias on Capital Market Investment Decisions of Indian Investors: An Explanatory Research

http://doi.org/10.21272/fmir.7(3).1-11.2023

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Abstract. *The present study explores the presence and impact of automation bias and status quo bias on the capital market investment decisions of Indian retail investors. In behavioral economics the term automation bias is known as the excessive dependency of investors on automated or computer generated information for stock selection decisions. On the other hand, status quo bias is the inherent tendency of an investor to keep his portfolio unaltered irrespective of the changing dynamics of capital market for a variety of reasons. In this study an attempt has been made to figure out the extent of presence and degree of impact of both the biases in the investment decisions of investors. The study is based on data collected through a five point Likert scale questionnaire framed to figure out answers to the research questions. The questionnaire was distributed among 496 retail investors of National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). The outcome of this study clearly point out that there is a definite presence of automation bias and status quo bias in investment decisions of the capital market investors of India and there is a considerable and statistically significant ($p<0.05$) magnitude of impact of both the biases on the investment decisions of Indian investors. The research also concludes that certain steps must be taken by investors to keep away from behavioral biases in investment decisions and shield their portfolio from unwarranted and potentially damaging behavioral mistakes or pitfalls. The researchers have a strong belief that this research is a maiden attempt to study automation bias and status quo bias among retail investors and will bring about some significant revelations in the study of behavioral economics particularly in the analysis of behavioral biases from the standpoint of capital market investors.*

Keywords: Automation Bias, Behavioral Finance, BSE, NSE, Socio-Demography, Status Quo Bias.

JEL Classification: D19, G02, O16.

Type of manuscript: research paper

Received: 13.06.2023 **Accepted:** 18.07.2023 **Published:** 30.09.2023

Funding: There is no funding for this research.

Publisher: Academic Research and Publishing UG (i. G.) (Germany)

Cite as: Shukla, S. & Shukla, S. K. (2023). Impact of Automation Bias and Status Quo Bias on Capital Market Investment Decisions of Indian Investors: An Explanatory Research. *Financial Markets, Institutions and Risks*, *7*(3), 1-11. http://doi.org/10.61093/fmir.7(3).1-11.2023

Introduction

Cognitive bias is a methodical way of thinking that results from the human brain's propensity to streamline information processing by applying a filter of own understanding and inclinations ***(Kahneman & Tversky,***

1996). The filtering procedure is an overlay strategy that allows the human brain to rapidly sort through and process voluminous volumes of knowledge ***(Wilk & Mata, 2012).*** The process works well, but it has some flaws that can lead to mental mistakes ***(Zindel & Quirino, 2014).*** In essence, cognitive biases enable people to figure out mental shortcuts for navigating everyday life, yet they can frequently lead to unreasonable perceptions and conclusions ***(MacLeod & Mathews, 2012).***

Cognitive biases frequently result from issues with consciousness, contemplation, and other judgmental errors ***(Noviangiee & Asandimitra, 2019).*** These frequently include insensible decision-making procedures, which make it simple for people to be impacted without consciously doing so ***(Otuteye & Siddiquee, 2015).*** Mental Heuristics are a type of covering and rectifying technique used to rapidly handle massive chunks of data and information ***(Ishfaq et al., 2020).*** Nobel laureates Daniel Kahneman and Amos Tversky first presented the idea of the presence of cognitive bias financial decision-making in 1972. Although the brain's propensity for divergence cannot be totally eliminated, being aware of predispositions may be helpful while taking investment related decisions ***(Leimar & McNamara, 2019).*** Companies can reduce prejudice through automated and manual processes, but they might not find themselves able in completely eradicating it. But not all biases are unavoidably harmful ***(Usman, 2018).*** The bottom line is that if a capital market investor resolves to remain vigilant with his investment portfolio, the chances of him losing out on his trade get significantly reduced ***(Berthet, 2022).***

The automated or machine induced predisposition can be defined as the excessive dependence on mechanized and computerized guides and choice subsistence approach ***(Skitka et al., 1999).*** The underlying concept behind the automation bias is the inclination of humans to opt for the path of minimum psychological exertion while inclining in relation to "automation or machine predisposition" ***(Mosier et al., 2017).*** A similar idea may be construed in a key manner that Artificial Intelligence and computerization function ***(Cummings, 2017).*** To be precise this is predominantly founded on gaining from huge arrangements of information ***(Skitka et al., 2000)***. This kind of ciphering presumes that situations or objects will not be fundamentally distinguishable in times to come ***(Goddard et al., 2012).***

Further, yet another viewpoint which ought to be contemplated is the threat of utilizing some defective educational information, in such a case the overall learning shall yield imperfect results ***(Lyell & Coiera, 2017).*** Automation Bias identifies with the manners by which calculations show the inclination of the utilized calculation or the belonging information. In the present scenario, man-made intellect or artificial intelligence is assisting us in revealing knowledge from information and upgrade the choice making of human beings ***(Skitka et al., 2000)***. An illustration of this model is the voice identification characteristic which is utilized in order to use our cell phones ***(Goddard et al., 2014).*** The investment related decisions of capital market investors also appear to be prone to automation bias because of the fact that investors take the refuge of automated technology particularly computer generated information for their investment decisions ***(Innocenti & Golin, 2022).***

The status quo bias or business as usual predisposition is named after the equity market investor's inclination to draw out and keep up the state of affairs as they are ***(Rubaltelli et al, 2005).*** In basic words, this implies that if a financial market investor is given a ton of alternatives with numerous perplexing and befuddling decisions, they will in general pick whichever choice expands their present course of action ***(Brown & Kagel, 2009).*** The hidden rationale behind this predisposition is that equity market investors are suspicious of progress ***(Godefroid et al., 2022).*** They see change as an expense and attempt to keep away from it quite far till the advantages far exceed the expenses in question ***(Fernandez & Rodrik, 1991).*** This is the motivation behind why they incline towards the state of affairs when confronted with an expanding number of decisions ***(Roca et al., 2006).***

Status Quo inclination is firmly identified with different predispositions like subsidizing and misfortune abhorrence. These predispositions frequently work in pair ***(Kiky, 2021).*** This is the motivation behind why equity market investors regularly stay with a known investment avenue for a long time, regardless of whether such a venture gives a lower return throughout an all-inclusive timeframe ***(Kempf & Ruenzi, 2006).*** The status quo predisposition can make investors clutch certain stocks. This is especially the situation when the stocks have been accumulated from unassertive sources like a legacy ***(Kahneman et al., 1991)***. There are numerous capital market investors who don't really want to change the stocks in the portfolio, regardless of whether such a change would add enhancement and make monetary misfortunes more uncertain ***(Filiz et al., 2018).*** The final product is that the equity investors end up improperly clutching certain investment products ***(Kiky, 2021).***

Research Objective

As a matter of fact, both automation bias and status quo bias appear to have a stern presence amongst Indian capital market investors. In this context, the core objective of this research is to estimate the impact of socio demographic variables like gender, age, marital status, educational qualification and current profession on the inherent tendency of Indian capital market investors to depend on system generated or automated information for stock selection and sticking around with a loss making stock for prolonged period.

Literature Review

In many workplaces, computers and related automated decision aids have been implemented with the express purpose of lowering human mistake. Analytical decision-making is frequently supplemented with computerized system monitors and decision aids ***(Skitka & Mosier, 1999)***. The adverse implications of automation bias need to be investigated, especially in the investment industry where choice mistakes might have serious repercussions. Automation Bias has not previously been well defined or explored ***(Goddard & Roudsari, 2011).*** Although often intended to protect in case of human mistake, automated technology can radically affect how individuals conceptualize their acts, which sequentially can propel advanced and distinct forms of error ***(Skitka & Mosier, 2000)***. Automation Bias doesn't seem to be exclusively associated with multitasking; instead, it seems to be related to the amount of reasonable load felt during decision-making tasks. Thus, pruning of cognitive load may be a pivot of Automation Bias prevention strategies ***(Lyell & Coiera, 2016).*** The goal of intellectual decision support is to lessen individual mistake and burden, but planners should be aware that, unless planned with the human mental and cognitive limits and inclinations in mind, increasing degrees of automation paired with undependable structures can possibly lead to new faults in structural functioning ***(Cummings, 2017).*** Due to incorrect prescription or misdiagnosis, the impact of Automation Bias might have major implications for target audience in the wellness industry, ranging from damage to mortality. In various literatures, "negative consultation" is commonly used as a phrase to describe when a seemingly accurate decision gets altered into a wrong one only because of some faulty advice ***(Goddard & Roudsari, 2014).*** The current research looked at how the performance of participants and other important result indicators were affected by functioning with various failure-prone support systems during training. On the whole, the findings indicated that the level of automation bias was impacted by training sophistication. Nonetheless, the levels of trust by participants quickly declined when they encountered automated errors at first place throughout the measurement concourse ***(Sauer & Chavaillaz, 2016).*** Automation bias which denotes the propensity to blindly welcome the result produced by a computer generated system, is a general danger associated with automation. A fundamental cause of Automation Bias and the ensuing absence of critical consideration or investigation of the findings is the absence of choices to examine the manner in which a system produced a particular inference ***(Straub, 2021).*** This study does not entirely cover all the variables that contribute to the issue of automation predisposition because they are intricate. In extension to demonstrating the presence of

inclination towards automation bias, the research serves as an ideological initiation point for further investigation into the causes (Gaddard and Roadsari, 2011).

H01: Automation Bias does not have a considerable impact on the capital market investment decisions of Indian investors.

On all accounts of this research, respondents in USA showcased a strong presence of status quo bias which was inconsistent with accepted economic doctrine. Most investors of USA choose to disregard information that may have resulted in better revenues. Thus, status quo bias is found to be largely resilient among respondents irrespective of the performance of stocks ***(Brown & Kagel, 2009).*** The outcome demonstrates that there is clear-cut evidence to prove that status quo bias is existent among capital market investors of Indonesia and verifies the intricacy of these students' investment decision-making processes. Indonesian investors get introduced to the market quickly but proceed slowly while selling their stocks. Thus, Indonesian investors are most susceptible to status quo bias, particularly in losing situations ***(Kiky, 2021).*** A prominent result of the loss aversion bias is that people have a stern propensity to maintain status quo since the drawbacks of doing so outweigh the benefits. The findings suggested that as an option was classified as a status quo, its popularity increased considerably. Additionally, the more options there are, the more advantageous this status quo is ***(Kahneman & Thaler, 1991).*** When investors are influenced by status quo bias, it causes them to frequently make similar decisions or concede to the status quo. Investors that neglect to upgrade their financial circumstances regardless of the possibility of profiting from it exhibit this bias. Investors maintain a position, such as holding onto stocks rather than selling them, or they behave in a less than ideal way in various ways ***(Baker & Ricciardi, 2014).*** The findings demonstrate that when presented with tough decisions, investors are highly prone to concede to status quo, which leads to more mistakes. This poor decision behaviour suggests that status quo bias will cause investors to choose things despite their preferences ***(Fleming & Thomas, 2010).*** The research demonstrates the way efficiency-strengthening reforms may be avoided, even though they can be widely embraced in the long run, if the names of winners and losers are unclear. The expanded version of this research demonstrates the presence of status quo bias in decision making ***(Camilleri & Sah, 2021).*** The authors add to the body of knowledge by demonstrating that investors tend to keep things as they are when it comes to mutual funds, this enables fund raising companies to increase the cost for mutual fund participants. Investors prefer to stopover in mutual funds even while the company consequently increases cost due to customer familiarity with fund manager that goes against their self-interests ***(Bryant & Evans, 2012).*** A study confirms that Bond market specialists closely align themselves with the existing interest rate that is viewed as a benchmark and status quo, while formulating their predictions. They undoubtedly suffer from status quo prejudice ***(Gubaydullina & Spiwoks, 2011).***

H02: Status Quo Bias does not have a considerable impact on the capital market investment decisions of Indian investors.

Research Design and Model

An explanatory research is a technique created to look into a phenomenon which needs to be thoroughly researched or deciphered. Here the major goal is to describe the avenues to be looked at for a limited quantity of information. With this approach, the authors have gained a natural understanding of the subject matter and have used it as a device to help them find the problems they may handle more quickly in future. The principal aim of explanatory research is to figure out causes and effects through testing of hypothesis. The current research is based on the following model:

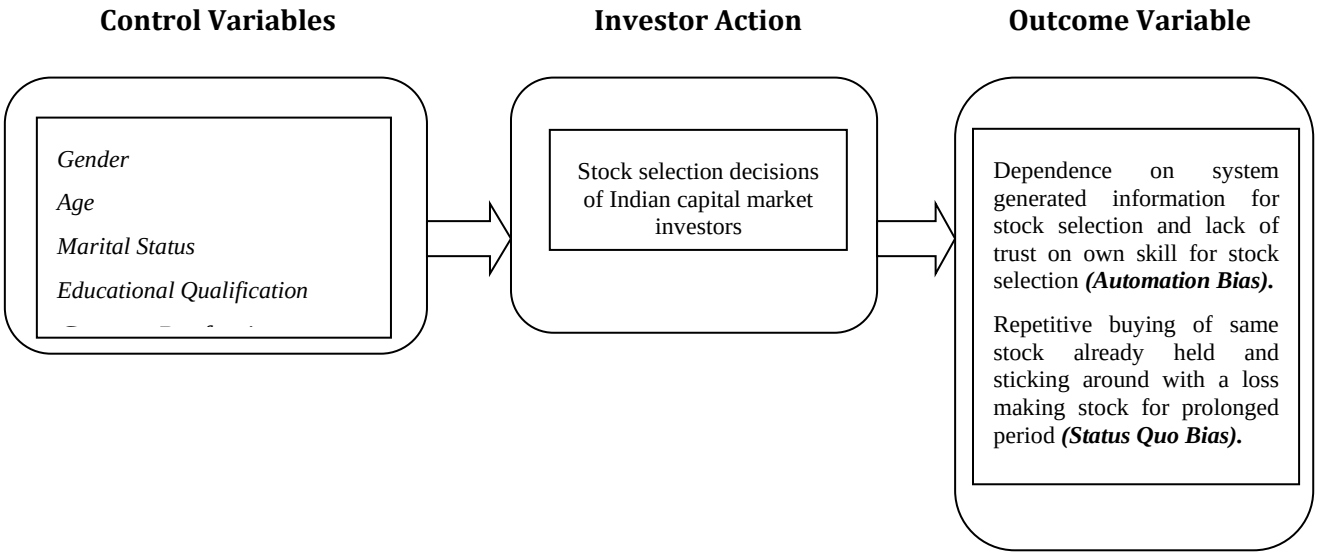

Figure 1.

Source: compiled by the author.

Sample Size Determination

The authors have used following formula for determining the appropriate sample size for the study.

$$S = Z^2 * p * (1-p) / M^2$$

Where, S is the sample size for infinite population.

Z is the Z score

p is the population proportion (assumed to be 50% i.e. 0.5)

M is the Margin of error

Thus, $S = (1.96)^2 * 0.5 * (1-0.5) / (0.05)^2$

S= 384

Moreover, in this study a sample size of 496 respondents has been utilized for analysis which can be considered sufficient for the research.

Data and Methodology

The current research is based on the data collected via a five point Likert scale questionnaire ***(Rensis Likert, 1932)*** comprising of total six items with three each relating to automation bias and status quo bias. The questionnaire was initially distributed to 505 respondents out of which 496 filled responses were received that have been considered for this research. This research is based on the data collected by following convenience sampling which is a type of non probability sampling wherein those participants are selected that comply to a predetermined criteria or the relative willingness of participants to become a part of the survey for conducting any study (***Etikan et al., 2015)***. In order to test the validity and internal consistency of the questionnaire items the researchers have used Cronbach's alpha which is one of the most widely used statistical measure for reliability testing ***(Tavakol and Dennick, 2011)***. The most commonly accepted norm for the value of Cronbach's alpha to reckon a scale reliable is 0.7 and above (***Bujang et al., 2018)***. The value of Cronbach's alpha of the scale used in this research was computed as 0.832 which averages 83.2% for the items of questionnaire.

Table 1. Reliability Statistics

N of Items	Cronbach's Alpha
06	.832

Source: Primary data analysis by the authors on SPSS 25.0.

The researchers have applied Kolmogorov-Smirnov test to comprehend whether the distribution of a singular variable or group of variables is part of a population having a specified distribution ***(Berger and Zhou, 2014)***. Therefore, the researchers have administered the Kolmogorov-Smirnov test of normality and the results of this test have been presented in Table 1.2. Moreover the p-value has been found to be less than 0.05 for all the nine variables considered under the study. Thus, on the basis of the results of Kolmogorov-Smirnov test and Shapiro-Wilk test the researchers have rejected the null hypothesis and it can be safely inferred that the presence of automation bias and status quo bias in Indian retail investors is not distributed normally.

Table 2. Tests of Normality

Variables	**Kolmogorov-Smirnov[a]**			**Shapiro-Wilk**		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Age	.257	496	.000	.860	496	.000
Gender	.261	496	.000	.871	496	.000
Marital Status	.290	496	.000	.852	496	.000
Educational Qualification	.272	496	.000	.867	496	.000
Current Profession	.243	496	.000	.873	496	.000
a. Lilliefors Significance Correction						

Source: Primary data analysis by the authors on SPSS 25.0

In order to comprehend whether investment decisions of Indian capital market investors are prejudiced by the presence of automation bias and status quo bias, the researchers have applied tools of descriptive statistics. Table 1.3 presents the values of mean and standard deviation of responses received from the survey participants. In the table item number 01, 02 and 03 are meant to test the presence of automation bias while item number 04, 05 and 06 have been designed to test the presence of status quo bias in investment decisions of investors. As already stated that data has been collected on a five point Likert scale with 1 for strongly disagree and 5 for strongly agree. Post analysis it is observed that that the mean values for all the questionnaire items is more than 3.5 which is a clear indicator of the fact that there is a strong presence of both the biases in investment decisions of Indian retail investors in capital markets. The finding is in agreement with ***Kahneman et al., 1991, Rubaltelli et al., 2005 and Brown and Kagel, 2009***.

Table 3. Descriptive Statistics

S.No.	**Variable**	**N**	**Mean**	**Std. Deviation**
01	I believe that information present on investment web portals about companies and their stocks are reliable.	496	3.52	.850
02	I do not prefer my own skills but computer generated information in taking stock investment decisions.	496	3.77	.832
03	I consider that Artificial Intelligence will be a game changer in future as far as stock investment decisions are concerned.	496	3.81	.860
04	I prefer to buy a stock repeatedly if it has given me good returns in the past month or year.	496	4.15	.812
05	I favour sticking around with a stock even when another stock with seemingly similar prospects is also available.	496	3.14	.912
06	I believe that the Indian stock market is always under constant threat and adding new stocks to portfolio can be very risky.	496	3.57	.901

Source: Primary data analysis by the authors on SPSS 25.0

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Table 4 presents the model fitting information that gives the likely difference between the baseline model (model without any independent variable) and the final model (model with all independent variables). The norm is that for model fit the Significance value must be less than 0.05 ($p<0.05$). The significant chi-square statistic states that the final model is a significant improvement over intercept only model. Therefore, the null hypothesis (H**0**) that there is no significant impact of the nine independent variables on automation bias among capital market investors of India can be rejected.

Table 4. Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1163.305			
Final	1111.883	51.421	25	.001
Link function: Logit.				

Source: Primary data analysis by the authors on SPSS 25.0.

Table 5 presents the Pearson and Deviance goodness-of-fit. The norm is that if the Pearson significance value is greater than 0.05 then the observed data is having goodness-of-fit with the fitted model. Thus it can be inferred that the collected data is accordant with the assumptions of model. Therefore the good fit assumption is accepted.

Table 5. Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	1809.044	1751	.163
Deviance	1069.497	1751	1.000
Link function: Logit.			

Source: Primary data analysis by the authors on SPSS 25.0

Table 6 presents the values of Pseudo R-Square i.e. the effect size to estimate the impact of nine independent variables on automation bias in investor decision making. In the table Cox and Snell, Nagelkerke and McFadden R-Square give a clear idea of the proportion of variance being explained by the independent variables in the dependent variable. Therefore, the Pseudo R-Square value of Nagelkerke which is .756 indicates that 75.6% variation in automation bias of Indian capital market investors is being explained by the nine independent variables considered under the purview of study. Since the value is greater than the generally acceptable norm of 0.7 so it can be said that near adequate variation is explained by the model.

Table 6. Pseudo R-Square

Cox and Snell	.755
Nagelkerke	.756
McFadden	.289
Link function: Logit.	

Source: Primary data analysis by the authors on SPSS 25.0

Table 1.7 presents the test of parallel lines where the null hypothesis is that the location parameters (slope coefficients) are the same across response categories. Since the significance value i.e. p-value is greater than 0.05 ($p>0.05$) the researchers have concluded that the slope coefficients are similar across all the response categories. So the hypothesis of parallel lines is also met and not violated.

Table7. Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	1111.883			
General	1075.974[b]	35.909[c]	75	1.000
The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.				

a. Link function: Logit.
b. The log-likelihood value cannot be further increased after maximum number of step-halving.
c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model.

Source: Primary data analysis by the authors on SPSS 25.0

Impact of Status Quo Bias on Investment Decisions of Indian Investors

Table 8 presents the model fitting information that gives the likely difference between the baseline model (model without any independent variable) and the final model (model with all independent variables). As already stated above, the norm is that for model fit the Significance value must be less than 0.05 ($p<0.05$). The significant chi-square statistic states that the final model is a significant improvement over intercept only model. Therefore, the null hypothesis (H**0**) that there is no significant impact of the nine independent variables on status quo bias among capital market investors of India can be rejected.

Table 8. Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	1226.805			
Final	1167.059	59.745	25	0.000
Link function: Logit.				

Source: Primary data analysis by the authors on SPSS 25.0.

Table 1.9 presents the Pearson and Deviance goodness-of-fit. The norm is that if the Pearson significance value is greater than 0.05 then the observed data is having goodness-of-fit with the fitted model. Thus it can be inferred that the collected data is pursuant with the assumptions of model. Therefore the good fit assumption is accepted.

Table 9. Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	1654.78	1751	0.950
Deviance	1124.908	1751	1.000
Link function: Logit.			

Source: Primary data analysis by the authors on SPSS 25.0.

Table 1.10 presents the values of Pseudo R-Square i.e. the effect size to estimate the impact of nine independent variables on status quo bias in investor decision making. In the table Cox and Snell, Nagelkerke and McFadden R-Square give a clear idea of the proportion of variance being explained by the independent variables in the dependent variable. Therefore, the Pseudo R-Square value of Nagelkerke which is .845 indicates that 84.5% variation in status quo bias of Indian capital market investors is being explained by the nine independent variables considered under the purview of study. Since the value is greater than the generally acceptable norm of 0.7 so it can be said that near adequate variation is explained by the model.

Table 10. Pseudo R-Square

Cox and Snell	.844
Nagelkerke	.845
McFadden	.305
Link function: Logit.	

Source: Primary data analysis by the authors on SPSS 25.0.

Table 1.11 presents the test of parallel lines where the null hypothesis is that the location parameters (slope coefficients) are the same across response categories. Since the significance value i.e. p-value is greater than

0.05 (p>0.05) the researchers have concluded that the slope coefficients are similar across all the response categories. So the hypothesis of parallel lines is also met and not violated.

Table 11. Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	1167.059			
General	1089.748[b]	77.311[c]	75	.405
The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.				
a. Link function: Logit.				
b. The log-likelihood value cannot be further increased after maximum number of step-halving.				
c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model.				

Source: Primary data analysis by the authors on SPSS 25.0

Conclusion

This research was fundamentally conducted to comprehend the influence of automation bias and status quo bias on the stock selection criteria of the capital market investors of India. The extensive literature review conducted by authors distinctly suggested that both these biases are immensely rampant in the investment decisions of investors in quite a few Asian and European nations and even in USA. In order to get a sense of the impact of automation bias and status quo bias on the Indian capital market investors, ordinal regression has been put into application.

The result affirms that both automation bias and status quo bias produce a significant difference on the capital market investment decisions of Indian investors as the Pseudo R-Square statistic i.e. Cox & Snell R^2 of 0.755 (automation bias) and 0.844 (status quo bias) respectively manifest a considerable impact on Indian investors. Similarly the Nagelkerke R^2 of 0.756 (automation bias) and 0.845 (status quo bias) further prove that Indian investors are under a stern grip of both these cognitive biases as far as capital market investment decisions are concerned. The findings are in accordance with ***Blankespoor et al., 2018, Yadav, 2015 Kristoufek & Vosvrda, 2014, Kiky, 2021 and Rubaltelli et al., 2005.***

Author Contributions

S.S. conceptualization, S.S. and S.K.S.; data curation, S.S. and S.K.S.; formal analysis, S.S.; investigation, S.S. and S.K.S.; methodology, S.S. and S.K.S.; project administration, S.K.S.; supervision, S.S.; validation, S.S.; visualization, S.S.; writing-original draft, S.S. and S.K.S.; writing-review & editing.

Funding

This research received no external funding.

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