

## **Influence of Cognitive Errors on Investor's Decision Making in Nigeria**

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**Abstract:** The study assessed the degree of influence of cognitive errors on investor's decision making. The study used primary data. The population consisted of clients of the top 10 stockbroking firms registered by the Nigerian Stock Exchange as at 31<sup>st</sup> January, 2017. These 10 firms were selected because they constituted 68.72% of total value of transactions as at 31<sup>st</sup> January, 2017. Data on assessment of behavioural finance in investment decision making among investors in Nigeria were obtained through structured questionnaire which was administered to 30 clients of each stockbroking firm, totalling 300. The data were analysed using percentage and binary logistic regression. The study concluded that cognitive errors, proxied by representative bias, anchoring and adjustment bias, illusion of control bias, hindsight bias, framing bias and gamblers fallacy, significantly influenced investor's decision making in Nigeria.

**Keyword:** Behavioural Finance; Cognitive Error; Representative Bias; Anchoring and Adjustment; Bias

**JEL Classification:** D92

### **1. Introduction**

Traditional finance is based on neoclassical economics and it assumes individuals are risk averse, have perfect knowledge and focus on maximizing their personal utility. An investor that behaves this way is termed as a 'Rational Economic Man' (Chandra & Kumar, 2008). A rational economic man is expected to make decisions consistent with the axioms of 'Utility Theory'. Friedman and Savage (1948) proposed the Utility theory by the analysis of choice under risk and uncertainty. They opined that it is possible to quantify exactly, how much utility an individual will derive based on the uncertain outcome of an economic decision. They propounded that individual can choose between various options to arrive at an optimal decision which maximizes the individual's expected utility. Normatively, this is how people should make economic decisions.

The work of two psychologists Daniel Kahneman and Amos Tversky contributed to psychology literature in the 1970s served as foundation and gave rise to a new paradigm in finance in the 1980s called Behavioural Finance. According to Nofsinger (2001), Behavioural finance differs from traditional finance in that it focuses on how investors and markets behave in practice rather than in theory by focusing on actual behaviour of investors in decision making. As knowledge in behavioural finance continues to increase, efforts to understand what drives individual investors and market behaviour will increase (Subash, 2012).

Complete understanding of human decision making might not be attainable because humans are not predictable by scientific models or theories but behavioural finance helps to provide framework to understand the implication of decision-making process of investors and financial practitioner. Behavioural finance neither assumes that people act rationally and consider all available information in decision making nor that markets are efficient but assumes people are 'normal'. According to

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Statman (1999), normal people have emotions and biases which impacts their decision as against 'rationality assumption.'

Behavioural finance describes behaviours and biases that differentiates individual investors from rational economic man. This was supported with notions of bounded rationality and cognitive limitation that is, individuals prefer decisions that moderately satisfy and not necessarily the optimum decision and that individuals do not have the ability to possess and process all relevant information as assumed by the traditional finance. According to Statman (1999), traditional finance asks too much of investors by assuming rationality, he proposed the rejection of the assumption of rationality of investors but as Statman (1999) wrote, "Traditional finance people are modelled as rational whereas behavioural finance people are termed normal". Rational investors will poses perfect rationality, self-interest, have perfect access to all relevant information and make an unbiased interpretation of information in a consistent manner while normal investors are expected to show biases as in the practical world as people tend to act 'normal' than rational.

It is expected for 'normal' individuals to act under biases, preference or personal beliefs and why individuals act according to these biases is yet to be identified by any researcher (Pompian, 2006). There are many biases identified by researchers over the decade but all of these biases are attributed to faulty reasoning that is, cognitive errors or feelings, that is, emotional biases. Statman (1999) also believed that traditional finance people are modelled as 'rational' whereas behavioural finance people are termed 'normal'. Normal investors are expected to have beliefs, preferences and personal values which will result in biases in decision making. Financial market volatility caused by investors' unpredictable reactions to information for investment decisions is usually of concern to capital market operators and policy makers. The traditional finance view of investment decision making is being challenged by behavioural finance that view biases as involved in investment decisions. However, despite the availability of studies in developed economies linking sub-optimal investment decision with individual biases, such studies are sparse in Nigeria; hence this study.

## **2. Literature Review**

### **2.1 Conceptual Review**

#### **2.1.1 Cognitive Errors**

Cognitive errors are statistical, informational- processing and memory errors as a result of faulty reasoning or analysis and personal beliefs that causes individual decisions to deviate from rational decisions of traditional finance. Cognitive biases are better corrected than emotional biases as investors are better able to identify sources of logical biases and could easily adapt or modify their decision making processes even when the decision making process is not completely understood by the investor. Cognitive errors could be called blind spots or distortion in human intellectual. Cognitive errors basically stems from faulty reasoning and could be corrected for by better information, education and better advice and thus cognitive errors could be better corrected for to a large extent and even eliminated in investors decision making process.

Cognitive errors are classified into two categories. The first category is the belief perseverance biases. This category deals with the way information is being received, interpreted and updated, while the second category is the information processing errors by the investor.

### **2.1.2 Belief Perseverance Biases**

These are biases that occur as a result of conflict of new information with previously held beliefs or cognitions. To overcome this conflict, people tend to notice information only of interest to them (selective exposure), ignore or modify information that conflicts with existing beliefs (selective perception), or remember and consider only information that confirms existing beliefs (selective retention). The biases categorised under this are conservatism bias, confirmation bias, representativeness bias, illusion of control bias and hindsight bias.

## **2.2 Theoretical Framework**

This study is anchored on the Prospect Theory.

### **2.2.1 Prospect Theory**

Expected utility theory has dominated the analysis of decision making under risk. It has been generally accepted as a normative model of rational choice and widely applied as a descriptive model of economic behavior. Thus, it is assumed that all reasonable people would wish to obey the axioms of the theory and that most people actually do, most of the time (Kahneman & Tversky, 1979). Prospect theory was developed as an alternative to expected utility theory by Kahneman and Tversky (1979). The theory describes how individuals make choices in situations in which they have to decide between alternatives that involve risk and evaluate potential losses and gains. Prospect theory utilizes the perception of individuals on their framing bias, that is, the framing of decisions as to either gains or losses and weighting uncertain outcomes. Kahneman and Tversky (1979) suggested that anomalies may arise as a result of editing of prospects. For example, the inconsistencies associated with the isolation effect result from the cancellation of common components because different choice can be interpreted in different ways, which could lead to inconsistent preference

The evaluating phase is the second phase of prospect theory. Kahneman and Tversky (1979) opined that investors place values on alternatives in terms of weighted and probability- weighted outcome to determine expected utility.

## **2.3 Review of Empirical Studies**

DeBondt and Thaler (1985) propounded that the people are systematically over-reacting to unexpected and dramatic news results in substantially weak form inefficiencies in the stock market. They concluded that mental accounting is a set of cognitive operations used by individuals and households to organize evaluate and keep track of financial activities.

Welch (2000) concluded that some investors rationalize their decision-making based on the fact that other investors are purchasing the same stocks. Relying on other peoples' decision-making creates a feeling of security for investors. He suggests that their decisions are creating profit because it is a public opinion that a certain stock will bring value to the owner.

Ritter (2003) rejected the traditional assumption of expected utility maximization with rational investors in efficient market. He suggested the two building blocks of behavioral finance as cognitive psychology (How People Think) and the limit of arbitrage (when market will be inefficient). The article further highlights many empirical patterns like stock market bubbles in Japan, Taiwan and The United State.

Chandra (2008) examined the relationship between investor's attitude towards risk and behavioral decision-making. The research was based on the secondary data. Through this research, the author

finds that unlike the classical finance theory suggests, individual investors do not always make rational investment decisions. The investment decision-making is influenced, largely, by behavioral factors like greed and fear, Cognitive Dissonance, heuristics, Mental Accounting, and Anchoring. These behavioral factors must be taken into account as risk factors while making investment decisions.

Cipriani and Guarino (2008) studied herd behaviour in a laboratory financial market with financial market professionals. The study combines the advantage of the controlled experiment with that of observing the behaviour of professionals, who are engaged in the day-by-day activity of trading, pricing and analysing financial assets. This study compares two treatments, one in which the price adjusts to the order flow so that Herding should never occur, and one in which event uncertainty makes Herding possible. In the first treatment, subjects herd seldom, in accordance with both the theory and previous experimental evidence on student subjects. In the second treatment, the proportion of herding decisions increases, but not as much as theory suggests; moreover, contrarianism disappears altogether.

Simon (2009) made a survey of literature on the effects of behavioral biases on capital budgeting. He discovered that the people tend to be overconfident and overly optimistic. He finds that the biased managers over-invest their firms cash flows, initiate too many mergers, start more firms and more novel projects and tend to stick with unproductive investment policies longer. Corrective measures to reduce the effect of manager biases include learning, inflated discount rate and contractual incentives but their effectiveness in curbing over investment appears to be limited.

Ishaya, Muturi and Memba (2017) studied the influence of overconfidence bias on investment decision making. The study concluded that overconfidence has a significant influence on investment decision making and recommended that investors should seek awareness on the bias in order to develop a strategy to minimize the effects of the bias and also seek proper advice and opinions from financial consultants before making investment decisions in order to minimize the influence of the bias.

### **3. Methodology**

This study used primary data. The population consisted of clients of the top 10 stockbroking firms registered by the Nigerian Stock Exchange as at 31<sup>st</sup> January, 2017. These 10 firms were selected because they constituted 68.72% of total value of transactions as at 31<sup>st</sup> January, 2017. Data on assessment of behavioural finance in investment decision making among investors in Nigeria were obtained through structured questionnaire which was administered to 30 clients of each stockbroking firm, totalling 300. The data were analysed using simple percentage and binary logistic regression.

In determining the influence of cognitive errors on investment decision making, the variables, representative bias (REP), anchoring bias (ANCH), illusion of control bias (IOC), hindsight (HSG), framing bias (FRM) and gamblers (GAB) were used to capture the cognitive errors. The study adopted a model in line with Ishaya, Muturi and Memba (2017) in examining the influence of cognitive errors on investment decision. The data were analysed using binary logistic regression analysis.

#### **3.1 Validity of Research Instrument**

The internal consistency of the instrument was determined using Cronbach's Coefficient Alpha which indicate a Cronbach alpha of 0.818. The collected data were obtained from 28 respondents from two firms not included in the sample used for the research. Data were then analysed using Pearson Product Moment Correlation Coefficient (PPMC) to determine the degree of reliability of instrument of the

study indicates the scale of all the items are within the satisfactory parameters. The estimate Cronbach’s alpha is above the .80 which indicates good reliability.

**3.2 Model Specification and Data Analysis**

The study adopted model in line with Ishaya et al. (2017) in examining the influence of cognitive errors on investment decision. Cognitive errors were measured by; Representative Bias (REP), Anchoring and Adjustment Bias (ANCH), Illusion of Control (IOC), Hindsight Bias (HSG), Framing Bias (FRM), Gamblers Fallacy (GAB). Econometrically, the relationship between cognitive errors and investor’s decision can be given as

INV=f (cognitive errors)

INV=f(Representative, Anchoring, Illusion of Control, Hindsight, Framing, Gamblers Fallacy)

$$INV_t = \beta_0t + \beta_1 REPt + \beta_2 ANCHt + \beta_3 IOct + \beta_4 HSGt + \beta_5 FRMt + \beta_6 GABt + \varepsilon \dots \dots (i)$$

Where;  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  were coefficients in the model and  $\varepsilon$  is the residual value.

INV = Investor’s Decision Making; REP = Representative Bias;

ANCH = Anchoring and Adjustment Bias; IOC = Illusion of Control;

FRM = Framing Bias; GAB = Gamblers Fallacy;  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$

These variable were captured on the questionnaire using a 5-point Likert scale namely; Very Low (VL), Low (L), Fair (F), High (H) and Very High (VH).

**4. Result Interpretation and Discussion of Findings**

**Table 1. Influence of Cognitive Errors on Investment Decision Making**

Variable	B	Z	Sig.	Exp( $\beta$ )
REP	4.315	25.569	.000	74.786
ANCH	1.890	20.691	.000	6.621
IOC	-.567	2.771	.037	.567
HSG	-2.495	18.465	.000	.083
FRM	-1.352	11.741	.001	.259
GAB	-1.711	14.522	.000	.181
Constant	1.613	12.324	.000	5.019

Source: Field Survey (2017)

**Table 2. Omnibus Tests of Model Coefficients**

**Omnibus Tests of Model Coefficients**

		Chi-square	Df	Sig.
Step 1	Step	169.632	6	.000
	Block	169.632	6	.000
	Model	169.632	6	.000

Source: Field Survey (2017)

**Table 4. Model Summary****Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	65.451 <sup>a</sup>	.627	.842

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

*Source: Field Survey (2017)*

The study assessed the influence of cognitive errors on investor's decision in Nigeria. Six cognitive errors were examined namely; Representative bias, Anchoring and Adjustment Bias, Illusion of Control Bias, Hindsight bias, Framing Bias and Gamblers Fallacy. These biases were tested on 188 investors and most of the investors exhibited representative bias and anchoring bias while illusion of control bias, hindsight bias, framing bias and gamblers fallacy was mildly exhibited according to the  $\text{Exp}(\beta)$  which represent the odd ration as seen Table 1.

All of the biases showed significant relationship with investment decision as the level of significance is  $< 0.05$  according to Table 1. Cognitive errors like anchoring, representative, gamblers fallacy, hindsight were reviewed by Waweru, Munyoki and Uliana (2008), Subash (2012), Chandra (2008) and Sukanya (2015) on their influence with investor's decision making process. They all concluded that investor's decision making process were highly influenced by these biases. This is confirmatory to the findings of this study on cognitive errors. The exhibition of this cognitive errors indicate a high likelihood of investors failing to update their beliefs constantly, fail to analyse investment properly by using smaller samples in investment analysis and ultimately, making investment decisions that are sub-optimal when compared to traditional finance investment analysis.

## 5. Conclusion and Recommendations

Cognitive errors are associated with intellectual capability of investors and the exhibition of cognitive errors indicate that investors in Nigeria possess less knowledge about finance and personal investment theories and they are more likely to rely on simple strategies which are not effective and efficient for investment and portfolio management.

Therefore, this study recommends that investors in Nigeria should increase their knowledge on behavioural finance by educating themselves on behavioural finance paradigms. Also, investors are advised to seek knowledge about behavioural biases to understand which biases they are susceptible to and how to either avoid or adapt to them. This will enhance their ability to make better investment decisions especially when making decisions under risk and uncertainty. The behavioural biases should also be reviewed always by investors as change in biases may occur over time. This could also be a means of improving and refreshing knowledge about behavioural finance by investors. It should be noted that, studies are yet to confirm the relationship between knowledge of behavioural finance and investor's rationality as rational investors tend to make good investment decisions, nevertheless, increase in knowledge of behavioural finance among investors is bound to help in making good investment decisions by investors.

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