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Psychological Biases, Investment Decisions and Financial Literacy of Ghanaian Investors during the COVID-19 Pandemic

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Abstract

Behavioural finance is a growing discipline globally. Notwithstanding its emerging popularity, little is known regarding the effect of psychological biases on the financial behaviours of investors during the COVID-19 pandemic in Ghana. Our study aimed to explore the path relationships among psychological biases, investment decisions, and financial literacy of individual investors in Ghana. We developed a research study model using 167 participants to explain the impact of behavioural biases on investment decision-making, with financial literacy serving as a mediation. Due to the COVID-19 pandemic, we used online questionnaires via Google Forms to collect primary data. Results from our analysis showed that psychological biases had direct effects on financial investment behaviours; heuristic ($b = 0.027$, $z = 1.137$, $\rho = 0.026$), disposition effect ($b = 0.037$, $z = 1.127$, $\rho = 0.027$), and prospect theory ($b = -0.037$, $z = -1.335$, $\rho = 0.018$). The findings of the studies showed a significant positive correlation between heuristics, disposition effect and investment decision-making, while prospect theory and investment decision-making had a negative correlation. Also, financial literacy had a positive mediation on the effects psychological biases had on investment decision-making in the Ghanaian financial market. Therefore, we recommended that stakeholders and organisations embark on sufficient and rigorous financial education during and after the COVID-19 pandemic to reduce the level of psychological biases that influence investors' decision-making.

Keywords: COVID-19, financial literacy, Ghanaian, investment decisions, investors, psychological biases.

1. Introduction

Most individual investors are involved in various kinds of investments to maximise the returns on their investment. An investment is anything that is held on now for the future. Cash and equities, securities, royalties, movable and immovable property, copyrights are all examples of investments. From the financial point of view, investments are all forms of assets (funds) that are invested now to receive a higher value or returns in the future (Potashnik et al., 2017). On the other hand, from the economic point of view, investments include the costs of creating, enlarging and technical re-equipment of capital (Potashnik et al., 2017). Economists over the world regard investments as long-term capital investments in various aspects and sectors of the economy, social programs, infrastructure, and environmental protection both inside one's country and abroad for

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the ultimate aim of development of production, entrepreneurship, social sphere, and profit (Aleskerova, Fedoryshyna, 2018).

Every investment in a market economy is shrouded by activities of risks and uncertainties that arise due to the inability to evaluate or examine the possibilities of a market situation using functional dependence (Bondarenko et al., 2019). Evidently, demographic, socio-economic and psychological factors have become the salient determinants of equity investment awareness (Bhattacharjee, Singh, 2017). Everyone makes an investment decision, more or less. There are several investment portfolios at the disposal of today's investors to choose from to deposit their savings. Therefore, analysing the investment process and decision-making in a substantially broader context (Peñaranda, 2016).

Traditional finance posits that in an ideal situation, the price of a share or investment security equals its "fundamental value" as investors seem rational. This fundamental value envisages the "discounted sum of expected future cash flows" if individual investors accurately process every information at their disposal. The discount rate is parallel to the accepted preference specification. Efficient Markets Hypothesis support the traditional finance assertion with the affirmation that actual prices reflect fundamental values, and as such, the market is assumed to be rational. It juxtaposes that an efficient market is a market where investment returns cannot be greater than what it is supposed to warrant with its associated risk no matter the kind of investment strategy applied (Le Luong, Thi Thu Ha, 2011).

Investors are not always rational. Thus, psychological biases may drive their financial investment decision-making (Sahi et al., 2013). In a situation where the decisions of individual investors are not rational, the effects of psychological biases are most likely to be identified (Kim, Nofsinger, 2008). Psychological biases such as overconfidence, representativeness, availability bias, gamblers' fallacy, anchoring, mental accounting, and disposition play a critical role in investors' decisions (Virigineni, Rao, 2017). These biases in themselves are not always harmful. There are times psychological biases can aid the individual investors to select the best course of action from the numerous options or possibilities and guide them to commit the less expensive mistakes (Sahi, 2017). So, it is of much significance that individual investors are cognisance of the likelihood of facing psychological biases to consider the financial risk they can tolerate (Kubilay, Bayrakdaroglu, 2016).

Furthermore, psychological biases have a critical influence on financial behaviour and decision making. Mostly, individual investors may not be conscious of their psychological biases. Investors will act more rationally if they become aware of their psychological biases. This manner of thinking by investors may increase the quality of their decision-making (Dervishaj, 2018). Notwithstanding the power of psychological biases in distorting investors' decision making, some researchers have noted that an individual investor's financial literacy can influence these biases (Jappelli, Padula, 2013; Prasad et al., 2021). Financial literacy is the ability to comprehend the operations of money in the world: how an individual manages to earn or make money, how the investor invests it, and how that individual shares it to help others (Giesler, Veresiu, 2014). Thus, individuals with high financial literacy tend to perform better in savings, identify risk, employ risk diversification, identify investments that give higher interest rates, and determine the rate they borrow. They also understand the time of value and the impact of inflation on investment returns, numeracy, and the relationship between risk and return (Lusardi, Mitchell, 2011). This trend was also the case during the COVID-19 era, where countries globally suffered some level of financial crises (Chhatwani, Mishra, 2021).

Before the COVID-19 pandemic, the Ghana banking crisis led to the collapse of several indigenous banks (Benson, 2019). The Ghanaian financial market witnessed many losses of returns on investment (Osei et al., 2019). Besides the economic problems faced by Ghanaians during the COVID-19 pandemic (Bamfo et al., 2020), there is a need to investigate the present relationship between psychological biases and financial investments behaviour in Ghana. From our review, studies that have been conducted by far do not address the impacts of psychological biases on financial investment decisions by individual investors in Sun-Saharan Africa. Also, few studies by researchers in Ghana (Addo, 2019; Owusu, 2020) have shown that some behavioural biases exist in individual investors' decision-making with much focus on the Ghana Stock Exchange. However, these few studies emphasise that the psychological biases of individual investors ought to be corrected as they tend to influence financial behaviour adversely. Our study aimed to explore the path associations among psychological biases, investment decisions, and financial literacy of individual investors in Ghana.

2. Materials and methods

This study used a descriptive research design. The target population for this study comprises individual investors who have made investments either in the past or now through the traditional banks, investment banks and the Ghana Stock Exchange. Due to the COVID-19 pandemic, we used online questionnaires via Google Forms to collect primary data. A sample of 167 individual investors in Ghana was selected using the purposive sampling technique. The study's sample consisted of 57.5 % males and 42.5 % females with a mean age (standard deviation) of 32.1(4.3). The majority, 53.9 % were between the ages of 30 and 34-year-old while the minority 3.6 % was above 40-years-old. A detailed breakdown of the descriptive details of the sample is shown in [Table 1](#).

Table 1. Statistics on demographic variables

Variables	Frequency	Percent
Gender		
Male	96	57.5
Female	71	42.5
Age (Years)		
24-29	42	25.1
30-34	90	53.9
35-40	29	17.4
<40	6	3.6
Education		
Bachelor's Degree	73	43.7
Master's Degree	89	53.3
Doctoral Degree	3	1.8
Post-Doc	2	1.2
Occupation History		
Private Sector Employment	42	25.1
Public Sector Employment	91	54.5
Self-Employment	12	7.2
Student	8	4.8
Unemployed	14	8.4
Nature of Investment		
Bonds	4	2.4
Credit Union	1	.6
Equities	4	2.4
Fixed Deposits	46	27.5
Gold/Silver	1	.6
Real Estate	48	28.7
Stocks	14	8.4
Treasury Bills	49	29.3

Our online questionnaire via Google Forms to obtain primary data from individual investors. Our instrument consisted of six sections (Parts A, B, C, D, E, and F). *Part A*: This contained demographic variables such as gender, age, level of education, marital status, religious affiliation, occupation, region of residence, and investment experience. Respondents answered these questions by clicking on the most appropriate option or entering brief responses in open-ended questions.

Part B: This section measured the use of heuristics in decision making with items adapted from Kengatharan and Kengatharan's (2014) scale. Example: "You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market or banking industry"; "Other investors' decisions of choosing their type of financial investments have an impact on your investment decisions."

Part C: This section evaluated respondents' disposition effects. Sample items are: "You prefer to make profits or at least break even in all trades or investments"; "You hold stocks or investments whose value has depreciated after your purchase with expectations that it will bounce back". Items in this section were adapted from an instrument developed by Shanmugham and Ramya (2012).

Part D: This part measured the level of financial literacy of respondents. Examples of items include; “When the prices of fuel and electricity rise, our living costs are reduced, and our purchasing power increases”; “When purchasing a car through instalments, the principal amount will generally be higher than that of a lump sum payment”; “Under any normal circumstances, a protracted loan period comes with high interest”. Financial literacy items were adapted from a study by Lusardi and Mitchell (2011). *Part E:* This section assessed the use of prospect theory among respondents. Sample items were; “You don’t have anything like ‘money you can afford to lose’ or ‘money for chilling’ when it comes to your daily budget”; “You tend to spend monies that you didn’t expect or work for in the same manner as your earned income or salary”. Prospect theory was measured with questions adapted from Nada (2013).

Part F: Financial investment decision-making behaviour section of the questionnaire evaluated participants’ buying decisions, selling decisions, investment choice, length of time to hold investment, and amount to be invested. We adapted items from Scott and Bruce (1995) for this section. Sample items included: “When investing, I trust my inner feelings and reactions”; “When I invest, it is more critical for me to feel the investment is right than have a rational reason for it”.

After the study was generated following online quantitative data collection, data screening and processing of responses were done. We used the JASP software [Version 0.14.1] for the data analysis (JASP Team, 2020).

1. Descriptive statistics were conducted to report the absolute and relative (percentages) frequencies measures of central tendency and dispersion (mean and standard deviation, respectively).

2. Mediation analysis was conducted to assess the effect of psychological biases on the effect of financial literacy on the relations between psychological biases and investment decisions.

The following mediation model equations were generated and used as follows:

i. Dependent regression:

Investment Decision Making ~ $b_{11} * \text{Heuristic} + b_{12} * \text{Disposition Effect} + b_{13} * \text{Prospect Theory} + c_{11} * \text{Financial Literacy}$

ii. Mediator regression:

Heuristic ~ $a_{11} * \text{Financial Literacy}$

Disposition_Effect ~ $a_{21} * \text{Financial Literacy}$

Prospect Theory ~ $a_{31} * \text{Financial Literacy}$

iii. Mediator residual covariance

Heuristic ~~ *Disposition Effect*

Heuristic ~~ *Prospect Theory*

Disposition Effect ~~ *Prospect Theory*

iv. Effect decomposition

$y_1 \sim x_1$

$\text{ind_}x_1_m1_y1 := a_{11} * b_{11}$

$\text{ind_}x_1_m2_y1 := a_{21} * b_{12}$

$\text{ind_}x_1_m3_y1 := a_{31} * b_{13}$

$\text{ind_}x_1_y1 := \text{ind_}x_1_m1_y1 + \text{ind_}x_1_m2_y1 + \text{ind_}x_1_m3_y1$

$\text{tot_}x_1_y1 := \text{ind_}x_1_y1 + c_{11}$

Terms are as follows:

y – The dependent variable will represent the investment behaviour of participants.

a or c – is the constant (intercept),

x – the predictors,

m – mediators

e – Is the error term.

β coefficients – this is the strength and the direction of the associations between independent and dependent variables.

3. Results and discussion

Response Rate

In this present study, a total population of 200 online responses was targeted for data collection. Nonetheless, 167 individual investors in Ghana responded to this survey. This number is 83.5 % of the response rate as targeted. This response rate and the sample size is adequate for the study’s analysis. Similar studies in behavioural finance had been conducted by authors with similar

sample sizes. For example, Hayat and Anwar (2016) administered a survey questionnaire to 158 individual investors trading in Pakistan Stock Market for data collection.

Direct Effects of Psychological Biases (Heuristic, Disposition Effect, and Prospect Theory) on Financial Investment Behaviour During the COVID-19 Pandemic

The analysis for this objective included bias-corrected percentile bootstrap confidence intervals and maximum likelihood (ML) estimation to calculate the parameters for a probability distribution. Psychological biases had varying direct effects on the financial investment behaviours among investors in Ghana using the Delta method standard errors. Heuristic had a direct positive effect on the financial investment behaviours among investors in Ghana ($b = 0.027$, $z = 1.137$, $\rho = 0.026$), with lower and upper limits above zero $[-0.026, 0.076]$. Also, disposition effect had a direct positive effect on the financial investment behaviours among investors in Ghana, ($b = 0.037$, $z = 1.127$, $\rho = 0.027$), with lower and upper limits without a zero $[-0.038, 0.109]$. Furthermore, prospect theory had a direct negative effect on the financial investment behaviours among investors in Ghana, ($b = -0.037$, $z = -1.335$, $\rho = 0.018$), which also excluded zero $[-0.104, 0.030]$.

Table 2. Direct Effects of Psychological Biases on Financial Investment Behaviours

Direct effects		Estimate	Std. Error	z-value	ρ	95% Confidence Interval	
						Lower	Upper
Heuristic	→ IDM	0.027	0.02	1.137	0.026	-0.03	0.08
Disposition Effect	→ IDM	0.037	0.03	1.127	0.027	-0.04	0.11
Prospect Theory	→ IDM	-0.037	0.03	-1.335	0.018	-0.10	0.03

Notes: Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator, IDM = Investment Decision Making

Our study identified that heuristic bias positively affected Ghanaian investors' financial investment decision-making. This finding was consistent with the conclusions of ul Abidin et al. (2017). Their results indicated a markedly negative impact between heuristic biases (overconfidence, representativeness, availability and anchoring) and individual investment decisions. Furthermore, Murithi (2014) identified that heuristic bias positively influences personal investment decisions among 120 individual investors in 22 licensed brokerage firms in Kenya. Similar to this study's finding, there existed a positive correlation between heuristics and investment decision making.

Conversely, the results from the present study identified that prospect theory had a negative direct effect on financial investment decision making in Ghana. As noted from a study by Kimani (2018) using secondary data from the Nairobi Securities Exchange, prospect theory as a type of psychological bias affected the financial decisions of stock investors. The study reported a strong consistency with the prospect theory, which opines that individual investors are convex (risk-seeking) in losses and concave (risk-averse) in gains. Further, the results showed that prospect theory came into play as there existed some degree of overreaction in the loser quintile portfolio, which had negative returns (losses). More so, there was no overreaction in the winner quintile portfolio, which had positive returns (gains) among investors.

Our current study showed that the disposition effect positively affected financial investment decision-making in Ghana. Similarly, Braga and Fávero (2017) observed a similar trend in their research. They surveyed a total population of 506 randomly selected investors who trade on the São Paulo Stock Exchange in Brazil through social media and the questionnaire link on the internet. Per the survey outcome, all individual investors exhibited the disposition effect. They all agreed to realise their profits much earlier than the gains, thereby rejecting the expectation that there would be no difference between the mean times to sell loss and profit-making stock. Contrariwise, Ben-David and Hirshleifer (2012) concluded that the disposition effect had less impact on whether German investors prefer realising gains over losses per se.

Mediating Effect of Financial Literacy on the Relationship Between Psychological Biases and Financial Investment Behaviours During the COVID-19 Pandemic

The Delta method standard errors and bias-corrected percentile bootstrap confidence intervals for indirect effect analysis were used to explore the mediating effect of financial literacy on the relationship between psychological biases and financial investment behaviours in Ghana during the pandemic. Subsequently, financial literacy (m) had significant partial indirect positive effect on the relations of heuristics (x1) and financial investment behaviours (y) in Ghana, with a bias-corrected bootstrap CI for the effect ($b = 0.001$, $z = 0.291$, $\rho = .007$), which excluded zero $[-0.006, 0.012]$.

Table 3. Mediation Effects of Financial Literacy on the Relations Between Psychological Biases and Financial Investment Behaviours

Indirect effects	Estimate	Std. Error	z-value	ρ	95 % Confidence Interval	
					Lower	Upper
Heuristic → FL → IDM	0.001	0.004	0.291	0.007	-0.006	0.012
Disposition Effect → FL → IDM	-0.020	0.011	-1.897	0.006	-0.052	-0.002
Prospect Theory → FL → IDM	-0.001	0.005	-0.220	0.008	-0.014	0.009

Notes: Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator, FL = Financial Literacy, IDM = Investment Decision Making.

From the study's findings, financial literacy had a significant partial indirect positive effect on heuristics and financial investment behaviours in Ghana. As Sabri and Afiah (2016) confirmed, there is a correlation between financial literacy and investment decision-making among participants from Malaysia. Furthermore, Grohmann (2018) noted a significant relationship between financial literacy and investment decision-making among middle-class people in Thailand.

Also, we noted in our results that financial literacy had a significant partial indirect negative effect on the direct impact that disposition and prospect effects had on the financial investment behaviours among investors in Ghana. As Lusardi and Mitchell (2011) reported, people with good financial literacy are more likely to make the right investment decisions. Emphasised by Aren and Zengin (2016), risk perception and level of financial literacy directly influence individuals' investment decision-making. Their study further asserted that there exists a significant relationship between financial literacy and investment decision making

4. Conclusion and recommendation

Several psychological biases significantly influenced individual investor decisions during the COVID-19 pandemic in Ghana. The sampled investors exhibited that psychological biases influence their financial investment decision-making instead of being rational. The most dominant psychological factors were heuristics and the disposition effect. Results from the study indicated heuristic had a direct positive effect on the financial investment behaviours among investors in Ghana. Also, the disposition effect had a direct positive effect on the financial investment behaviours among investors in Ghana. In contrast, prospect theory directly negatively affected their financial investment behaviours. Additionally, financial literacy significantly mediated the effect of heuristics and prospect theory on financial investment behaviours partially. However, it partially negatively mediated the impact of disposition effect on the financial investment behaviours among investors in Ghana negatively. A path model of the mediation is shown in [Figure 2](#).

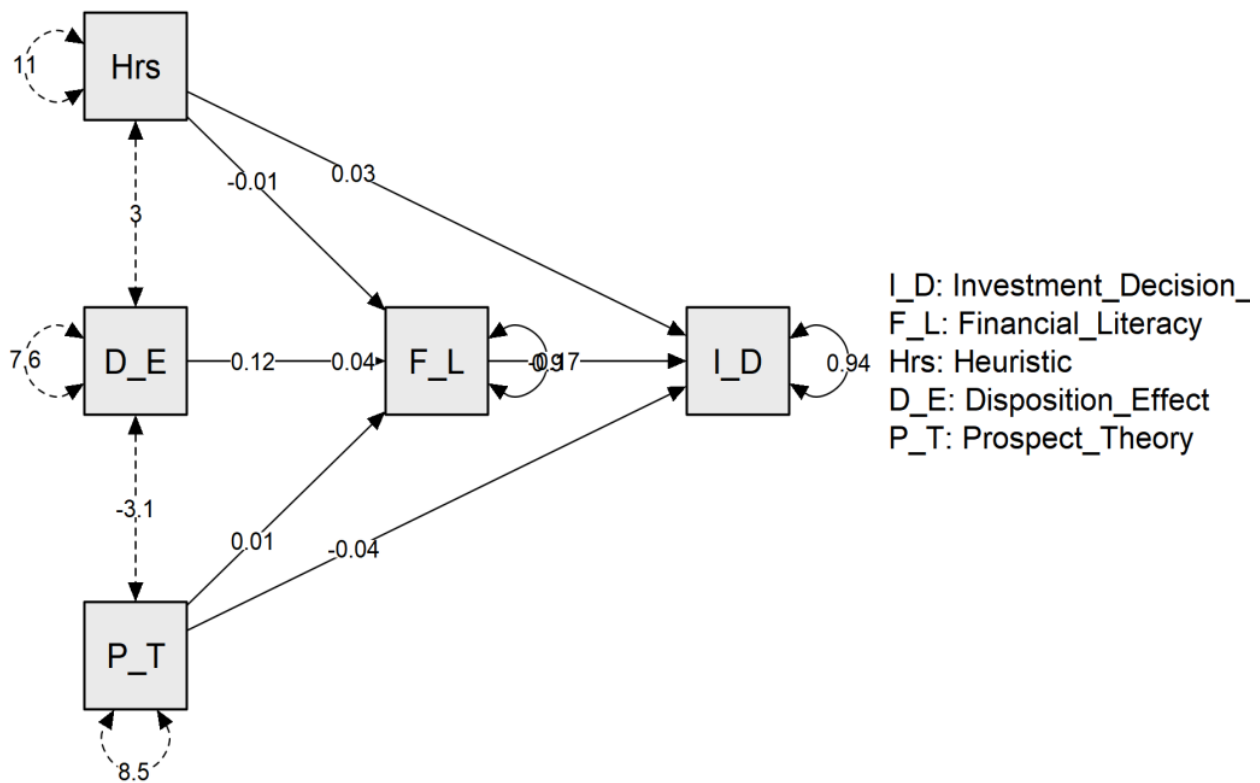


Fig. 2. Path Plot of Mediation Model

The research recommends that more financial education be given to individual investors in the Ghanaian population. Training programmes and workshops on behavioural biases and investments that will create awareness for individual investors on how to identify these biases, guard themselves, and manage the excesses must be organised frequently. This education will go a long way to overcome unfavourable investment outcomes and reduce the anomalies that will have a devastating effect on individual investors during and after the COVID-19 pandemic.

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6. Conflict of interest

We declare that we have no conflict of interest in the conduct of this study or declaration of results.

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УДК 33

Психологические предубеждения, инвестиционные решения и финансовая грамотность ганских инвесторов во время пандемии COVID-19

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Аннотация. Поведенческие финансы – растущая дисциплина во всем мире. Несмотря на его растущую популярность, мало что известно о влиянии психологических предубеждений на финансовое поведение инвесторов во время пандемии COVID-19 в Гане. Наше исследование было направлено на изучение взаимосвязи между психологическими предубеждениями, инвестиционными решениями и финансовой грамотностью отдельных инвесторов в Гане. Мы разработали модель исследования с участием 167 участников, чтобы объяснить влияние поведенческих предубеждений на принятие инвестиционных решений, при этом финансовая грамотность выступала в качестве посредничества. В связи с пандемией COVID-19 мы использовали онлайн-анкеты через Google Forms для сбора первичных данных. Результаты нашего анализа показали, что психологические предубеждения оказывают прямое влияние на поведение в отношении финансовых вложений; эвристика ($b = 0,027$, $z = 1,137$, $\rho = 0,026$), эффект расположения ($b = 0,037$, $z = 1,127$, $\rho = 0,027$) и теория перспектив ($b = -0,037$, $z = -1,335$, $\rho = 0,018$). Результаты исследований показали значительную положительную корреляцию между эвристикой, эффектом диспозиции и принятием инвестиционных решений, в то время как теория перспектив и принятие инвестиционных решений имели отрицательную корреляцию.

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Кроме того, финансовая грамотность оказала положительное влияние на влияние психологических предубеждений на принятие инвестиционных решений на финансовом рынке Ганы. Поэтому мы рекомендовали заинтересованным сторонам и организациям пройти достаточное и тщательное финансовое образование во время и после пандемии COVID-19, чтобы снизить уровень психологических предубеждений, влияющих на принятие решений инвесторами.

Ключевые слова: COVID-19, финансовая грамотность, ганец, инвестиционные решения, инвесторы, психологические предубеждения.