AN INVESTIGATION INTO FINANCIAL PRODUCT KNOWLEDGE AND ITS RELATION WITH INVESTMENT DECISIONS AMONG UNDERGRADUATES OF PUBLIC SECTOR UNIVERSITIES IN PUNJAB, PAKISTAN

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ABSTRACT

Lack of financial product knowledge is one of the most important problems prevailing in the business communities, business companies and business personnel, particularly in the societies like Pakistan. This influences the ability of the investors to make fruitful decisions in terms of their investments. This study investigates the financial product knowledge and its relationship with investment decisions among the undergraduate students of the public sector universities in Punjab, Pakistan. A mix of multistage, simple random and convenient sampling techniques was applied to select a sample of 445 respondents. A well-designed questionnaire was used for online data-collection. A statistical data analysis was made. Alpha test was applied to construct the index variables used in the analyses. The inference criteria test was used to back up the discriminant validity. Correlation and path coefficients analyses were carried out to see the relationship between the variables. R Square was used to see the contribution of independent variables to explain change in the dependent variable. Results showed a significant relationship between the financial product knowledge and investment decisions. It is suggested that short-courses and trainings should be offered to the business and student community for capacity building in investment decisions. The curricula and contents of the related courses should also be upgraded in the HEIs of Pakistan.

INTRODUCTION

While the importance of the financial knowledge, apparently, has been mentioned in the literature available but the gaps in financial education in the curricula, teaching methodologies and education programs have rarely been investigated, particularly from the students' perspective enrolled in the public sector universities in the developing societies like Pakistan. The important factors that influence financial knowledge among undergraduate students include educational, family, personal and financial experiences and exposure to finance-related information and resources. Different studies have been carried-out on the implications of financial knowledge for investment preferences, risk tolerance and general financial behavior of students (Usama and Yusoff, 2019). Fitch Rating showed that, despite the present state of the global economy, Indonesians still have faith in their country's economy and its external sector. Developing nations like Indonesia continue to prioritize economic growth as a national aim (Neumann, 2021). All national economic activities, especially those involving older people, have contributed to Indonesia's steady economic growth. According to Rasool and Ullah (2020), an area's median age is being pushed forward by its aging population, which is a result of higher life suspense. To elaborate, an aging population is a sign of a region's progress toward its goals of ending child mortality, enhancing education, creating more employment possibilities, maintaining equality & liberty, boosting the quality of reproduction, and bettering health services. From a

more conventional (utility-based) perspective, investors want to maximize their portfolio's value and their financial gain (Agarwalla et al., 2015).

Nevertheless, the likelihood of encountering obstacles is comparatively higher, particularly in poorer nations. In terms of the Ease of Doing Business (EoDB) Index, Indonesia ranks at 72 out of 190 nations. Foreign Direct Investment (FDI) in Indonesia has grown significantly (Yüksel et al., 2020). Furthermore, economists from both rich and developing nations have spent a lot of time and energy trying to determine steps for reaching to a threshold level of inflation by analyzing primary data from many countries and time-series data from individual cases (Wollie, 2018). Financial knowledge, demographic factors, and personal economic situations are only a few of the antecedent elements that have implications for investing decisions (Wijaya et al., 2023). Meanwhile, investors, in their twilight age, are more likely to give careful consideration to all factors when making financial decisions (Christanti and Mahastanti (2011). Ajay and Sharma (2016) stated that raising people's level of financial knowledge by investing in knowledge is crucial to enable them to make educated investment decisions. (Janor et al., 2016) noted that financial decision-making is a key component to determine financial aptitude and financial welfare. Therefore, one of the keys to personal and national success is to identify distinctive variables that are positively associated with investment choices. (Fazal, 2017) said that despite its significance, the field could have been

more generous. (Chen and Volpe, 1998) argued that the idea had received little attention in Ghana and called for additional research on the subject. It has also been found that financial knowledge is generally low in Ghana (Atakora, 2013). A 2009 survey on adult financial knowledge in Ghana found that 42% of the population in the north, 48% in the middle and 56% in the south regions were financially literate (Barnara, 2015). The 2016 National Financial Literacy Strategy also supported these findings. It is because it reported that 41% of Ghanaians had the necessary financial-skills (Pritazahara and Sriwidodo, 2015). Therefore, it is said that most of the Ghanaians lacked the knowledge to access financial services; hence there was a felt need to promote financial knowledge in Ghanaian society (Zaimovic et al., 2023). The survey recommended that the people should be told about the availability of different financial options that enable them to buy homes, send their children to college, start their enterprises, so on and so forth. Some Ghanaian customers of microfinance institutions and entertainment clubs, in the recent past, saw that their investments had wiped out (Owusu, 2015). Furthermore, it was also found that the majority of the victims were traders. It was essential for these victims to have adequate education and training in investment and other financial matters to avoid the sufferings.

The above situation demonstrates that while a reasonable amount of work has been done on the subject, lesser attention has been paid to investigate into the situation on the topic in the Pakistani society. Again, it is more crucial to look into the financial knowledge of the undergraduate students who are passing through the best opportunity for enhancing their education levels in the public sector universities. Therefore, this research was designed with the following objective. The primary objective of the study was to investigate the financial product knowledge and its relationship with the investment decisions of the respondents. The ultimate objective of the research was to suggest measures for capacity building for better investment decision making among the undergraduates of public sector universities of Pakistan.

HYPOTHESES DEVELOPMENT
The review and logical discussion made below provided guidelines to develop research-hypotheses and conceptual-framework for this study. Therefore, hypotheses development has been discussed and presented below. To argue a conceptual relationship between the independent and dependent variables of the study, a logical discussion has been made below, by discussing the conceptual relationship between different variables, one by one. At the end of this discussion, the conceptual framework has been concluded and presented in the shape of schematic-diagram. This is done to gather all the discussion in one diagram for understanding of the interested readers.

The Relation between Financial Product Knowledge and Investment Decisions
In order to decide better investment-selections, undergraduates should broaden their financial knowledge and understand more about the many options available to them. Investors who are good at choosing options may also be more likely to diversify their holdings and increase their profits. Investors who are well-versed in the relative risks and rewards of various assets are better able to tailor their portfolio allocations to their risk profiles and long-term financial objectives.

For instance, a person who knows how to trade options may hedge losses in their stock portfolio using protective inputs, which show them blowing this whistle because they are able to go to work making use of their knowledge of financial products. It makes

them to have an assessment targeting different financial products and associated traits and link their investment-decisions with the score obtained. Observational studies (for instance, where people of different knowledge levels invest) or interviews with individuals on their investment strategies and decisions follow a cohort of people longitudinally to observe their knowledge about financial products and watch what they invest in, identifying trends or correlations on the associated Venn Diagram; a qualitative research technique. Raut (2020) tested the hypothesis to find if undergraduates who score higher on financial product knowledge assessments are significantly more likely to engage in diverse investments. Therefore, this research indicated that more financially literate investors exhibited increased investment differentiation. This greater knowledge can also create more confidence, and this causes increased aggression in an investment strategy. For instance, a study may find that individuals who take part in financial education classes report higher engagement and satisfaction with their investment decisions. By arguing this, we can go deeper into any of these aspects, such as creating the knowledge assessment or discussing case studies related to financial product education. Therefore, a hypothesis exploring the relationship between knowledge about investment options (independent variable) and investment decisions (dependent variable) is presented below:

H1 "Higher levels of knowledge about financial products positively influence investment decisions". This happens by increasing confidence and enabling more informed choices to the investors.

H1: There is a direct and significant relationship between Knowledge about Financial Products and Investment Decisions.

The Relation between Accessing Financial Product and Investment Decisions
When individuals have better access to several financial products such as stocks, bonds, mutual funds, and digital investment platforms, they are more expected to make up-to-date and planned investment decisions that bring them in-line with their investment targets. For example, an investor with access to online investment platforms can quickly buy and sell a range of assets, enabling them to respond promptly to market changes. On platforms like Robin hood, it makes buying fractional shares highly accessible, which means investors can diversify even if they have very little to invest. Undergraduates with this kind of access may also discover investment vehicles such as ETFs or commodities they might never have thought about otherwise. According to research, customers of Robo-Advisors tend to have improved portfolio performance on average because they automatically rebalance and manage strategic asset allocation. It has been suggested to interview undergraduates through surveys for understanding the link between access to financial products and services on investment preferences and portfolio composition.

Research on investor's profiles and case studies of their access and investment strategies to understand changes in investment decisions over time for undergraduates as they get or do not get access to financial products are also needed. This is crucial to see that how undergraduates with access to investment platforms and products in broader areas reveal higher participation rates, as indicated by data available at a link between having stock market apps and more engagement in the same. Undergraduates are exposed to the products they can invest into through gaining financial knowledge. For example, this research topic may be refined and found useful for those people who frequent investors.

It is because these people tend to become more knowledgeable about market trends and product offerings.

H2 "Greater access to financial products positively influences investment decisions". This leads to a wider range of investment opportunities and improved portfolio diversification.

H2: There is a direct and significant relationship between Accessing Financial Products and Investment Decisions.

The Relation between Financial Products Knowledge and Optimism Bias

H1a: Greater information on financial products has relationship with investment decisions in a positive way through the mediation of optimism bias. It is because optimism bias induces individuals to believe in medium-higher benefits and lower risks associated with their investments. This hypothesis expresses that more sophisticated knowledge about financial products may lead undergraduates to develop an optimism bias, which could be reflected in their choices-surrounded investments. For example, informed investors may have greater confidence in their expectations of return and risk consequences.

H1a: There is a direct and significant relationship between Knowledge about Financial Products and Optimism Bias.

For example, the investor who understands the functioning of the mutual funds may feel optimistic about choosing them for long-term growth, believing they will outperform the market. This knowledge can create a bias where they underestimate the risks of market fluctuations. One student knowledgeable about stocks might have a bias towards believing that they can identify trends better than average investors, leading them to invest aggressively in tech stocks. Their optimism about their ability to predict market movements may overshadow the hidden risks. It is suggested to conduct a survey measuring information of investment products (e.g., through quizzes), altitudes of optimism bias (using a validated scale), and recent investment decisions (e.g., types of assets invested in, the frequency of investments). Statistical methods like fundamental equation exhibiting to examine the relationships among knowledge, optimism bias, and investment decisions, confirming the mediating effect of optimism bias, have also been recommended.

It is further proposed to do experiments where participants are provided with varying levels of information about financial products to observe changes in optimism bias and subsequent investment behaviors. This research study may show that undergraduates with higher financial knowledge report greater optimism regarding their investment outcomes. For instance, a study could find that educated investors are more likely to invest in equities because they feel confident about potential returns despite market risks. Theories in behavioral economics suggest that greater knowledge can lead to overconfidence, where informed individuals believe they can outperform the market, which may skew their risk assessments and investment decisions. The said hypothesis illustrates the mechanism through which knowledge about financial products can enhance investment decisions through the mediation of optimism bias. By understanding the interplay between knowledge, perception, and decision-making, we can better appreciate the ways & means used by the investors to approach the financial markets.

The Relation between Accessing Financial products and Optimism bias

In studying the relation of financial knowledge with investment decisions among undergraduates in Punjab, Pakistan, it is crucial to examine how accessing financial products influences investment behavior, with optimism bias acting as a mediator. The independent variable is accessing financial products (like savings account, mutual funds or stocks). This can indicate not only the active participation of a person financial markets. But, the way optimism bias hijacks us is the process of decision-making while accessing these financial products. There is the theory that students who actively use financial products may be more likely to make investment decisions caused by the implications of their exposure to financial instruments and products. Nevertheless, the existence of optimism bias and its implications for their perceptions about financial risks and returns may intervene to make them more prone to risky investment. Though students may enter financial products with an idea to make rational investments, yet their optimism bias can lead them to have high hopes. This leads them towards overconfidence and suboptimal decision-making.

H2a: undergraduate student who make use of numerous financial facilities tend to be interested in informed investment decisions.

H2a: Optimism bias mediates the relation in accessing financial products and investment decisions.

Hence, even if students exceled in being exposed to different financial products, their optimism biasness may drive them to have more optimistic view by exhibiting risky investment actions.

H2a: Accessing Financial Products => Optimism Bias (Direct Positive Significant)

This hypothesis is important because it shows that there might be a gap between having access to financial products and making good decisions. The more extensive availability of the financial products to the students opens new ways for them to make less-informed decisions. Consequently, it is vital for financial knowledge programs to tackle optimism bias because it ensures that students comprehend on the strategies to purchase financial products. Again students should also be capable to identify the risks they are going to undertake and the eventual outcome of their investment choices.

The Relation between Financial Products Knowledge and Optimism Bias with Investment Decisions.

However, to investigate the mediating mechanism through optimism bias between financial products (independent variable) and investment decisions (dependent variable) among undergraduates in Punjab, Pakistan is highly critical as little attempts have been made through the previous research studies to test this relationship. Financial products knowledge equips undergraduate students with a set of financial tools, hopefully, leading to better investment decisions. Likewise, the higher level of the existing optimism bias overestimates favorable results.

The hypothesis is that while increased investor knowledge about financial products should lead to better investment decisions, the presence of optimism bias may moderate this effect. For example, it is stated that even well-informed students who know a great deal about financial products may be more likely to make risky investment decisions if they also possess greater amounts of optimism bias than their peers. This cognitive bias can cause them to become extra overconfident on the return prospects and careless about the risks inherent in their trades. This diminishes the utility of being good at understanding financial products for making better investments.

H1b (Indirect Effect): Financial products knowledge positively affects investment decisions. Although a better understanding of financial products, on the whole, tends to result in more sensible investment decisions, yet overconfidence may counteract this positive relationship. The students with a high optimism bias

could choose greater risky investment options, despite their wide knowledge about financial products.

H1b: There is an Indirect and significant Relationship of Financial Products Knowledge with Investment Decision through Optimism Bias (Mediator).

It is an important theory to consider because it shows that having knowledge of financial products cannot at all be all of making sound investment decisions. Minimizing optimism bias is important, because otherwise it distorts the kind of inferences that are possible based on this knowledge. Financial knowledge programs should be developed alongside with a teaching of undergraduate learning financial products and showing that most fall into the category of high risk-yield trade, at meetings. The same entrepreneurs need to be trained for the detection and management of cognitive biases like optimism bias to execute investment decisions in a more realistic manner.

The Relation between Accessing Financial Products and Optimism Bias with Investment Decisions.

While probing into the interplay of financial knowledge and investment decisions of undergraduates (in Punjab, Pakistan), it seems important to visualize the effect of having access to financial products on investment decisions as mediated by optimism bias. While consuming financial products centers on interacting with different investment vehicles, like savings accounts or stocks and bonds (e.g. intended to help them make smarter investments), it is found that the positive relationship was partially mediated by optimism bias. It is stressed that optimism is a cognitive bias where individuals blindly believe in the odds of success to be over-estimated, and risks to be under-estimated.

Again, it is posited that, with financial product access expected to enhance investment decision making through higher market exposure and familiarity, optimism bias can weaken such process. More interestingly, students of high optimism bias can be easy to riskier type issues despite having been in many financial products. This bias may cause them to overestimate the potential returns and underestimate the risks of investing in financial products. Resultantly, this reduces the extent to which access to such products affects investment decisions.

H2b (Indirect Effect): Optimism bias as a Mediator between accessing financial products and investment decisions. Optimism bias weakens the effect of general access to financial products on investment decisions despite experiencing financial products. Therefore, students having higher optimism bias tend to make more-risky or less cautious investment choices.

H2b: There is an indirect and significant relationship of Accessing Financial Products and Investment Decisions through the mediator Optimism Bias.

This hypothesis is relevant because it states that merely engaging with financial products does not guarantee better investment decisions in the presence of optimism bias. Financial products knowledge programs should not only focus on increasing students' access to and understanding of financial products but also address cognitive biases to ensure that their investment decisions are both informed and realistic. Recognizing the indirect effect of optimism bias helps in designing more effective educational interventions that promote balanced decision-making in the financial contexts.

The Relation between Optimism Bias and Investment Decision

The implications of optimism bias for investment-decisions should be investigated in order to understand the effect of optimism bias on this dependent variable. Understanding the mechanism by which optimism-bias influences investment decision making among undergraduates in Punjab, Pakistan, is crucial. As a mediator, optimism bias characterizes the situation where individuals believe they are less likely to experience a negative outcome as compared with others. This bias, in turn, influences investment decisions. The investment-decision is a quantitative value that describes the extent of goodness or badness of an individual's choice for financial-investments.

The hypothesis describes that the optimism-bias has implications for investment-decisions by changing the risk-perception and prospective-returns. In particular, high optimism-bias can cause investors to be overly-optimistic and make risky investment-decisions. Optimism-bias, in fact, serves directly to induce this effect through biasing the students' evaluations of investment-opportunities. Resultantly, they overstate the expected-returns and understate risks.

H3 (Direct Effect): Investment-Decisions are influenced by a direct effect of optimism-bias. This, essentially, assumes that higher the level of optimism-bias, the riskier will be the investment-decisions. In other words, undergraduates with high levels of optimism-bias, are more likely to be engaged in risky-investment decisions.

H3: Optimism Bias has a direct, positive and significant relationship with the Investment Decisions.

A summary of all the above hypotheses is presented in Table 1.

Table 1. Summary of the developed hypotheses.

H. No	Hypotheses	Direction	Significance
H1	There is relation between Financial Product knowledge and Investment Decision are Associated.	Positive	Significant
H2	There is relation between Accessing Financial Products and Investment Decision Associated.	Positive	Significant
H1a	There is relation between Financial Product knowledge and Optimism Bias Associated.	Negative	Insignificant
H2a	There is relation between Accessing Financial Products and Optimism Bias.	Positive	Significant
H1b	Financial Product knowledge through mediator Optimism Bias and investment Decision	Negative	Insignificant
H2B	Accessing Financial Products through mediator Optimism Bias and Investment Decision.	Positive	Significant
H3	There is relation between Optimism Bias and Investment Decision.	Positive	Significant

Conceptual Framework

Based upon the above discussion, to present a relationship at the conceptual-level between different variables of the study, the following schematic presentation has been made below in the Figure 1. It was a prerequisite before testing this relationship, at the empirical-level, in the analysis-part of this paper.
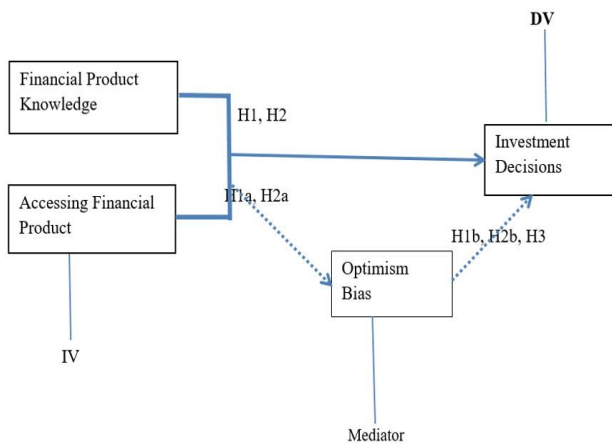

Figure 1. Schematic-diagram.

Financial product knowledge and accessing financial product are the independent variables and investment decisions is the dependent variable of this study. The complete line with arrow shows the direct relationship and the dotted-lines with arrows show the indirect relationship between the variables.

METHODOLOGY

This part of the research paper describes methodology that comprises the sampling, data-collection and statistical techniques used for data analyses and presentation of results.

Sampling and Sample

The population of the study consisted of all the students studying in various undergraduate programs at almost 45 government universities situated in different cities of Punjab-Pakistan. While taking into account different stages of the sampling procedures and requirements, multistage, convenient and simple-random sampling techniques were used for selection of the universities, faculties, departments and, ultimately, the students. At the first stage, two universities, the University of Okara (UO), Okara, and the University of Agriculture, Faisalabad (UAF) were chosen conveniently. This was done while considering the possible convenience in online data collection due to the cooperation and support of friends and colleagues at both the universities. Data collection was done through using students' "Study WhatsApp Groups" for sending and receiving online questionnaires. Another important reason included that these universities were having a large number of the enrolled undergraduate students, representing the total population in this category in the public-sector higher education institutions (HEIs) of the province of Punjab.
At the second stage, Faculty of Sciences at UAF and the Faculty of Business Management Sciences at UO were selected through the simple random sampling technique. A list of all the faculties at both the universities was obtained and then one faculty from each university was selected through the simple random sampling technique. At the third-stage, the Chemistry and BBA departments were selected through the simple-random sampling technique from the above mentioned faculties, respectively. At the next stage, 252 BBA students at UO and 193 Chemistry students at UAF

were chosen by simple random sampling technique. The sample size has been determined through the application of adequate statistical formula to ensure its representativeness. For instance, population of the undergraduate students in the HEIs of Punjab and the required confidence & precision levels were also considered. The calculated ample size was 480 respondents. However, 445 students returned the filled questionnaires while the remaining 35 failed to do the needful. Therefore, the sample size used in this research was 445 respondents.

Data Collection

The questionnaire was prepared keeping in mind the study objectives, literature, conceptual framework and indicators relevant to financial product knowledge and investment decisions. The questionnaire was divided into various parts such as the respondents' background characteristics, financial product knowledge, assessing financial products, optimism bias and investment decisions. Various scales have been utilized in social and business research to collect data from the human beings chosen as subjects in various researches conducted by different organizations and researchers, worldwide. These scales are titled as Likert-Scale, Likert-type Scale, Semantic-Scale and others for data-collection through using statements as part of the data-collection tool. In the questionnaire developed for this study, Likert-type scale was utilized for data collection and measuring the responses of different statements.

Data Analyses

The collected data were analyzed by using different statistical techniques. Alpha test was applied to see the validity of the statements to be combined to construct the index variables. These index variables were used in the data analyses as the single statements cannot be used to measure the responses. Correlation and path coefficient tests were applied to see the relationship between the study variables. The application of the R square was made to see the contribution of each independent variable in explaining the change in the dependent variable. The inference criteria test (HTMT inference) was used to back up the discriminant validity. The results have been presented and discussion is made in this paper (see section 'data and interpretation' below).

The Procedure of Indexation

However, no single-statement can be used to measure a concept or idea. It is because human attitude, behavior, perception, etc. are multidimensional and can present more than one concept or idea. Therefore, it is recommended that two or more statements can be used to measure a variable in the social and business science research. Again, no researcher or social scientist is sure that the statements being used are measuring the same idea for which these have been constructed and are uni dimensional. Hence, Alpha-Test is being used for ensuring the validity of the statements to be combined for measuring the same idea. The scale of the Alpha-Test ranges from 0-1. The closeness of the outcome towards the value of 1 (i.e., .7 to .9) ensures the validity of the statements being used for measuring the same concept, idea or variable.

The Index-Variable

The variable coming as outcome of the above mentioned indexation procedure is called Index-Variable. In the present study, all the statements used in the questionnaire were run through the Alpha test. Various Index variables such as financial

product knowledge, accessing financial product, investment decisions and optimism-bias are presented below in different tables (see Tables 2-5).

Data and Interpretations

The data presented in Table 2 show the reliability value of the index-variable titled "accessing financial product" which was .881; hence, highly-reliable. In other words, the statements used to measure the value of the variable were depicting the same idea and were uni dimensional; a prerequisite for combining these statements for indexation and using the index-variable in the data-analysis.

This research would benefit more from a structural equation modeling strategy since it is more compatible with the prediction models (Bentler et al., 1987). Smart PLS4 was used to test the study model. First, wellness of each scale was looked the way it worked in terms of reliability and validity. The term "convergent validity" is used to describe the relationship between measures or whether they are on the same scale (Hair et al., 2010). It is a simple way of saying the extent of agreement there is between measures on the same scale (*Duan* et al., 2019). Composite reliability (CR 0.70) and average variance extracted (AVE 0.50) should be measured for each concept in order to evaluate the convergent

validity (Fornell and Larcker, 1981). All of the variables in Table 2 exceed the minimally allowable CR level of accessing financial product (0.913. AVE of accessing financial product was (0.677). The factor loading level of 0.70 is suggested one, and all variables reach it. According to Table 2, the factor loadings of the variables fall somewhere between 0.805 and 0.847.

The data presented in Table 3 reveal that the statements used to measure the variable titled financial product knowledge were depicting the same idea and were unidimensional. It is because the value of the Alpha-Test was .795; hence, highly-reliable. Therefore, the index-variable named financial product knowledge was used in the data-analysis in this paper.

Composite reliability (CR 0.70) and average variance extracted (AVE 0.50) should be measured for each concept in order to evaluate the convergent validity (Fornell and Larcker, 1981). All of the variables in Table 3 exceed the minimally allowable CR level i.e. in the interval of 0.843 to 0.913. CR of financial product knowledge (0.859) and the value of AVE 0.549. According to Table 3, the factor loadings of the variables fall somewhere between 0.723 and 0.762.

Table 2. Cronbach's Alpha-Test results for index-variable accessing financial product.

Accessing Financial product	SFL	Alpha- α	CR	AVE
I prioritize buying the items that are necessary	0.811			
Before I buy something I carefully consider whether I can afford it	0.847	0.881	0.913	0.677
I compare prices when shopping for major expenses	0.830			
I use a spending plan or budget	0.822			
I keep track of my expenditure and income	0.805			

Note(s): α = Cronbach's alpha, CR = Composite reliability, SFL = Standardized factor loadings, AVE = Average variance extracted.

Table 3. Cronbach's Alpha-Test Results for "Index-Variable Financial Product Knowledge".

Financial product Knowledge	SFL	Alpha- α	CR	AVE
When there are several similar products, I tend to buy what is recommended as the most selling product.	0.736			
How does the suitability of a financial product (e.g., stocks, bonds, mutual funds) influence your investment decisions?	0.755			
What factors do you consider when determining if a financial product aligns with your investment goals and risk tolerance?	0.762	0.795	0.859	0.549
What are the fees associated with accessing different financial products, and how do these fees affect your investment returns?	0.729			
How do you evaluate whether the costs of accessing a financial product are justified by potential returns or benefits?	0.723			

Table 4. Cronbach's Alpha-Test Results for "Index-Variable Investment Decisions".

Investment Decision	SFL	Alpha- α	CR	AVE
Have you ever received professional advice or guidance regarding your investment choices based on your level of financial literacy?	0.726			
In your opinion, how important is it to have a solid understanding of financial matters when making investment decisions?	0.683			
How do you think improving your financial literacy could impact your investment decision-making process?	0.693			
Do you believe that being aware of optimism bias can help you make more objective and realistic investment decisions?	0.742	0.846	0.883	0.520
Have you ever experienced situations where your optimism bias influenced your investment choices?	0.762			
You are influenced by experts (Consumer or representative) and other investors decisions while taking investment decisions	0.717			
To what extent do you think optimism bias plays a role in shaping your investment decisions?	0.723			

The data shown in Table 4 depict that the statements used to measure the variable "investment-decisions" were unidimensional and depicting the same idea. It is because the Alpha-Test value was .846; hence highly-reliable. Therefore, the index-variable called investment-decisions was used in the data analysis in this study.

Smart PLS4 was used to test the study model. First, wellness of each scale was looked the way it worked in terms of reliability and validity. The term "convergent validity" is used to describe the relationship between measures or whether they are on the same scale (Hair et al., 2010). It is a simple way of saying the extent of agreement there is between measures on the same scale (*Duan* et al., 2019). All of the variables in Table 4 exceed the minimally allowable CR level. Investment decisions was (0.520). The factor loading level of 0.70 is the suggested one, and all variables reach it. According to Table 4, the factor loadings of the variables fall somewhere between 0.683 and 0.762.

The data shown in Table 5 indicate the reliability of the statements used for constructing the index variable titled optimism-bias with Alpha-Value .846; hence highly-reliable. This confirms that these statements were unidimensional and depicting the same idea; a prerequisite for combing two or more statements to construct an index-variable. The same was used in the data-analysis in this paper.

First, wellness of each scale was looked the way it worked in terms of reliability and validity. All of the variables in Table 5 exceed the minimally allowable CR level. The value of AVE was (0.883). The factor loading level of 0.70 is the suggested one, and all variables reach it. According to Table 5, the factor loadings of the variables falls between 0.685 and 0.760. If a measurement is to be considered representative of its field, its discriminant validity must be checked (Hair et al., 2010). The dissimilarity between measurements is shown by this (*Duan* et al., 2019). For discriminant validity to be satisfied, each variable's square root of AVE must be larger than the other correlation coefficients (Fornell and Larcker, 1981). Tables 2, 3, 4, and 5 demonstrate that discriminant validity is supported because the square root of AVE for each variable is larger than its shared variance within a construct. Hence, the results demonstrate that the convergent validity has been attained.

Table 5. Cronbach's Alpha-Test Results for "Index-Variable Optimism Bias".

Optimism Bias	SFL	Alpha- α	CR	AVE
How does optimism bias influence investors' perception of risk and return in investment decisions?	0.685			
Can you explain how optimism bias might lead investors to underestimate potential risks associated with an investment opportunity?	0.697			
What are the psychological mechanisms behind optimism bias and how do they affect investment behavior?	0.737			
In what ways does optimism bias impact long-term versus short-term investment strategies?	0.760	0.846	0.883	0.519
How can investors mitigate the negative effects of optimism bias while still harnessing its potential benefits?	0.717			
How does optimism bias affect decision-making during market booms and downturns?	0.719			
How do professional investors and fund managers manage optimism bias within their investment processes	0.726			

Assessing Measurement-Model
In accordance with Hair et al. (2017) the researchers examined the external model for validity and reliability. This led to an evaluation of the convergent reliability and internal consistency of the AVE, CR, and SFL with respect to standardized factor loadings. Tables 2 to 6 show that the results demonstrated sufficient reliability and convergent validity, with SFL, CR, and AVE, all exceeding the specified thresholds (0.736, 0.859, and 0.549, respectively). Second, after applying the method proposed by Fornell and Larcker (1981), that is, the square root of AVE must be larger than the sum of any two correlations between latent constructs, discriminant validity was determined. Henseler et al. (2015) also used the advanced Hetrotrat-Monotrait Ratio Inference (HTMT inference) criterion test to back up the discriminant validity. Final results: AFP= 0.881 and FPK=0.795 indicated acceptable model fitness according to Hair et al. (2017).

Correlation Analysis
The inner or structural model is used to unveil the association between model's constructs (Hair et al., 2017). The predictive power of the model was assessed through the most common. With reference to, (summarized detail of developed hypotheses) there were significant relationships between the variables of four hypotheses, shown in the Table 7.

Application of the Path-Coefficients Analysis
The statistical results of the hypotheses with 5,000 bootstrap samples and 95 per cent bias corrected confidence interval are shown in Table 8. Further, the results pertaining to behavior outcomes demonstrated that accessing financial product was supported and have highly significant effect and the results pertaining to behavior outcomes demonstrated that financial product knowledge was not supported and have an insignificant effect. Thus confirming H1a not supported due to an insignificant effect. The results revealed the significant effect of optimism bias on investment decision. Therefore, H3 significantly affected and highly supported. The results of the direct effects are summarized in Table 8.

Application of F Square
The current research also followed (Li et al., 2019) recommendations (effect sizes: small =0.02, medium = 0.015, and large = 0.35) to measure effect size (F^2) scores. The results showed the following effect sizes (F^2): F^2 AFP = 0.076, F^2 FPK = 0.001 and F^2 OB = 795.752, which were all large effect sizes including Financial product knowledge (FPK).

Table 6. Discriminant Validity Results (HTMT Ratio Table).

HTMT Ratio Table	Accessing Financial Product	Investment Decision	Financial Product Knowledge	Optimism Bias
Accessing Financial Product	-	-	-	-
Investment Decision	0.742	-	-	-
Financial Product Knowledge	0.861	0.543	-	-
Optimism Bias	0.739	0.703	0.540	-

Table 7. Presentation of the relationships between the variables (hypotheses tested).

hypotheses tested	Investment Decision	Accessing Financial Product	Financial Product Knowledge	Optimism Bias
Investment Decision	1.000	-	-	-
Accessing Financial Product	0.614	1.000	-	-
Financial Product Knowledge	0.470	0.718	1.000	-
Optimism Bias	0.999	0.611	0.466	1.000

Table 8. Results of the Path-Coefficients Analysis.

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AFP -> OB	0.306	0.307	0.062	4.902	0.000
FPK -> OB	-0.042	-0.041	0.059	0.723	0.470
OB -> ID	0.999	0.999	0.001	1911.407	0.000

Table 9. Presentation of the Results of F Square.

Variables	F-square
Accessing Financial Product -> Optimism Bias	0.076
Financial Product Knowledge-> Optimism Bias	0.001
Optimism Bias -> Investment Decision	795.752

Application of R-Square

Method of coefficient of determination (R^2 value), which ranges from 0 to 1. The R^2 value of 0.899, 0.520, 0.25 is considered as substantial, and moderate, respectively (Hair et al., 2017). For the current model, the values of R^2 for endogenous constructs are given in Table 10.

Assessing Direct Effect of Variables (Path Coefficients)

In Table 11, the p-value is 0.471 which is greater than the level of significance (0.05), so the null hypothesis was accepted. The results were statistically non-significant between the financial products knowledge and optimism bias. It is concluded that the financial product knowledge has a non-significant and also negative effect on optimism bias.

Indirect/Mediating Effect Analysis of Variables

As far as the mediating analysis is concerned, the researcher followed the product indicator method in Smart PLS 4.1, which is preferable when the sample size is medium to large and latent independent and mediating constructs are reflecting measures (Henseler and Chin, 2010). The interaction effect of accessing financial product through optimism-bias on investment-decision H2b has significant effect and the interaction effect of financial product knowledge through optimism-bias on investment-decision H1b has insignificant effect. Moreover, the results of accessing financial product variable showed significant effects on investment decision through optimism bias as a mediator and the results of financial product knowledge variable showed insignificant effects on investment decision through optimism bias as a mediator. The results are shown in Table 12 and Table 13.

Table 10. Presentation of the Results of R-Square.

Variables	R-square	R-square adjusted
Investment Decision	0.899	0.899
Optimism Bias	0.520	0.515

Note: *p < 0.01, **p < 0.05 VIF = variance inflation factor, ID = Investment Decision, AFP = Accessing financial product, FPK= Financial product knowledge, OB= Optimism Bias; Investment Decision (R^2 ID) =0.899, Optimism Bias (R^2 OB) = 0.520.

Table 11. Presentation of the Results of the Direct Effect (Path Coefficients).

Variables	Original Sample (OS)	Sample Mean (SM)	Standard deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
AFP -> OB	0.291	0.292	0.062	4.681	0.000
FPK -> OB	-0.041	-0.041	0.057	0.721	0.471
OB -> ID	0.978	0.978	0.002	501.812	0.000

Note: Significant level of variables: ***p < 0.001

Table 12. Results of the Indirect/Mediating Effects (Specific path analysis).

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
AFP -> OB -> ID	0.285	0.286	0.061	4.675	0.000
FPK -> OB -> ID	-0.040	-0.040	0.056	0.721	0.471

Note: Significant level: ***p < 0.001; significant level: p < 0.05.

Table 13. Confidence Interval at 95%.

Variables	Original Sample (O)	Sample Mean (M)	C.I lower Limit 2.5%	Upper Limit 97.5%
AFP -> OB -> ID	0.285	0.286	0.164	0.403
FPK-> OB -> ID	-0.040	-0.040	-0.150	0.071

CONCLUSIONS

The results showed a significant relationship between accessing financial product and investment decisions. The results also showed insignificant relationship between financial product knowledge and investment decisions as direct and indirect effect through optimism bias as a mediator. The explanation for this insignificant relationship can be found in the powerful impact of the optimism bias that weakens the power of the financial knowledge while making investment-decision. Interestingly, there was a significant relationship between accessing financial product and investment decision through mediator optimism bias. It can be said that these findings are relevant to the undergraduates enrolled in the public-sector universities of the province of Punjab, only. However, the claim made here is that these findings can be generalized to the undergraduate students of all the public sector universities of Pakistan. It is because, the higher education policy and command is owned by the higher education commission (HEC) of Pakistan. Therefore, the degree programs and course contents are one and the same to a great extent. Although minor changes are allowed by the HEC but the ratio of the major and minor courses is almost the same through Pakistan. All the public sector universities are following the Semester System for delivering educational instructions at the undergraduate and postgraduate levels. In short, these findings can be generalized for all the Pakistani universities. Furthermore, the study opens doors for further research on the value of specific financial education initiatives, potentially, leading to educational strategies that address knowledge about financial product and accessing financial product needs, particularly, among the educated youth in the country. The financial-education facility can also be enhanced up to the workers engaged in the relevant fields, through short courses and training programs in the evening and on weekends. However, it should be, again, more specific in terms of content, structure and mode of delivery of these programs. Again, while introducing the possible curriculum reforms in the universities, the importance should also be given to the financial education curriculum and teaching methodologies. At the end, it is to state that this research focused on undergraduates enrolled in the public sector universities only. The private-sector universities of the country should also be included for the relevant and preferably comparative research studies, in future.

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