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Measuring aggressive decision-making behavior: A confirmatory factor analysis

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Abstract

This research paper aims to develop and validate a questionnaire for measuring aggressive investor behavior (AIB). The design of the questionnaire holds significant importance, given the absence of validated questionnaires in the current body of literature. Currently, limited research is available on aggressive investor behavior. In order to integrate behavioral finance theory and market microstructure into the study of decision-making behavior, it is essential to develop and validate a questionnaire model for aggressive investor behavior. This research involved three stages. First, the compilation of a questionnaire. Second, test its validity and reliability. Finally, after conducting statistical analysis, a total of 40 investors participated in the pre-survey. A confirmatory factor analysis (CFA) was conducted with 324 investors as respondents. The questionnaire developed to assess aggressive investor behavior and its determinant factors has been proven valid and reliable. The questionnaire is composed in straightforward language, making it simple to understand. However, using this questionnaire in other areas may necessitate further adjustments and modifications. To the best of the authors' knowledge, no previous studies have developed a questionnaire to assess aggressive investor behavior from the perspective of the Indonesian stock market. The research findings offer valuable insights for scholars and financial institutions keenly interested in finance research. This study provides a guideline in the form of a valid questionnaire to facilitate research, especially concerning aggressive investor behavior. Additionally, this research contributes to the literature on financial behavior by providing a validated questionnaire for further exploration.

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1. Introduction

Advances in technology and capital markets have given rise to a concept of how the stock exchange operates, as described in the study of market microstructure. Decision-making can be categorized into two main types: market orders and limit orders. Market orders involve selling or buying at the best bid or best

offer, while limit orders involve queuing at a level below the best bid or offer, ensuring the execution of the transaction. Aggressive investors are those who use market orders when executing their transactions, while non-aggressive investors utilize limit orders (Chiu, Chung, & Wang, 2017; Hung, Chen, & Wu, 2015; Lee, Jung, & Oh, 2020; Rzayev & Ibikunle, 2021).

The Indonesia Stock Exchange provides investors with the ability to submit aggressive or non-aggressive orders. According to Hung and Lien (2019), aggressive investors are those who choose market orders in an effort to get their orders executed quickly and definitively. Conversely, non-aggressive investors utilize limit orders, aiming to secure the most favorable price by placing their quotes in the limit order book (LOB).

There is ample evidence in the literature that behavioural biases have an impact on the decision-making. One prominent behavioral bias that significantly affects decision-making is overconfidence (Ngoc, 2014). Overconfidence leads individuals to overestimate the accuracy of the information they acquire, overestimate their own abilities, and underestimate the risks associated with managing and controlling events (Kim & Nofsinger, 2008). The role of information in decision-making is of paramount importance in this study. Various sources of information serve as references in investor decision-making, including fundamental information, technical information, market maker information (known as "bandarmology" information among Indonesian investors), and information provided by social media influencers (Cwynar, Cwynar, Pater, & Filipek, 2019; Filbert, 2016; Karo-karo, 2017; Listyorini, 2020; Nuzula, Sisbintari, & Handayani, 2019).

Despite the growing interest in investor behavior research, there is a significant research gap that persists in the literature. Previous studies have examined various aspects such as investment decisions, transaction frequency, volume, and risk-taking (Khan, Tan, & Chong, 2017). The intricate decision-making processes guiding investors on when to use market orders versus limit orders have not been adequately explored (Ekaputra, Liu, Rhee, & Zeng, 2021; Tripathi & Dixit, 2020). Our study aims to bridge this research gap by offering comprehensive insights into the determinants of aggressive decision-making behavior from the perspective of the Indonesian stock market.

In the domain of stocks and investor behaviour, our study adopts a novel and unique methodology in contrast to prior scholarly investigations. What sets our model apart is its integration with the entire range of market information, such as fundamental, technical, and bandarmology analysis, market maker analysis (known in Indonesia as bandarmologi analysis), as well as the influence of social media influencers. Additionally, we incorporate overconfidence as a behavioral factor that acts as a mediator between the source of information and the aggressive behavior of investors. To the best of our knowledge, the integration of investor behavioral biases with market information to understand aggressive investor behavior is a novel contribution that has not been explored in previous literature.

This research aims to achieve two main objectives. First, it aims to design a questionnaire as a reliable tool for measuring aggressive investor behavior. Second, it aims to develop a scientifically structured and validated questionnaire that is user-friendly and applicable to stock investors, particularly in countries that employ an order-driven market system. This study contributes to the literature in three key aspects. First, it contributes to the advancement of questionnaire design for examining the behavior of aggressive investors. Second, it offers a novel perspective in the development of a model for measuring aggressive investor behavior that can be utilized for future research. Finally, it establishes a foundation for further studies on decision-making, specifically related to investor aggressiveness, the utilization of various information sources, and behavioral biases.

This article provides an overview of the questionnaire design model for assessing aggressive investor behavior. The process of questionnaire design involved several stages. The first stage involved constructing and developing items based on a literature review and Forum Group Discussions (FGDs). The second phase was the process of construct validation, which was carried out through conducting interviews with professionals from the sector as well as scholars from academia. The third stage encompassed a pre-survey through pilot testing to gather preliminary data. The fourth stage involved testing the validity and reliability of the constructs using factor analysis, resulting in a valid and reliable questionnaire design. At the completion of this stage, a total of 51 questionnaire items were obtained, consisting of respondent characteristics and behavioral perception statements. Additionally, the research model was measured through confirmatory factor analysis (CFA), which confirmed the validity and reliability of the questionnaire design.

This paper is divided into four sections. The first section provides the background of the study. The second section describes the materials and methods utilized. The third section presents the findings of the research. Finally, the fourth section concludes the paper by discussing the implications and limitations of the study.

2. Literature Review

The market microstructure encompasses elements like the trading mechanism, market configuration, regulatory framework, equity, and market design. Each of these plays a pivotal role in asset exchange, price information, and price formation (Westerholm, 2019). In stock trading systems, the term "order" refers to instructions for conducting buy or sells transactions in the Limit Order Book (LOB). Consequently, investors can be categorized as active or passive investors, as well as aggressive or patient investors (Westerholm,

2019). Aggressive investors opt for market orders when executing transactions, promptly executing their orders at the prevailing market price. Conversely, patient investors prefer limit orders, placing their orders at predetermined prices and waiting for the price to reach their desired level before executing the transaction.

The development of technology and the capital market has given rise to a concept that explains how the stock market operates, as described in the study of market microstructure. Decision-making can be categorized into two main types: market orders and limit orders. Market orders involve buying or selling at the best available price (best bid or best offer), while limit orders involve placing orders at a level below the best bid or offer and queuing until the transaction is executed.

Aggressive investors are those who use market orders when executing their transactions, while non-aggressive investors prefer to use limit orders (Chiu et al., 2017; Chung & Lee, 2022; Hung et al., 2015; Rzayev & Ibikunle, 2021). Research examining the relationship between overestimation and aggressive buying has shown that investors with a higher risk tolerance tend to engage in more active trading, while those who perceive themselves as more knowledgeable than other investors tend to engage in more aggressive trading (Dorn & Huberman, 2005).

Werner, Bondt, and Thaler (1985) conducted a study on the phenomenon of excessive market reactions using stock market return data. The research findings provide evidence of irrational behavior among investors in the market. One of these irrational behaviours is overconfidence. Overconfidence leads them to overestimate the accuracy of the information they possess, underestimate risks, and exaggerate their abilities in controlling various events (Vörös, 2020).

Within the domain of investing, the assessment of overconfidence can be accomplished by examining many indicators, including overestimation, overplacement, and overprecision (Han, Li, & Li, 2020; Vörös, 2020). Overestimation pertains to investors' inclination to perceive themselves in a more favorable light than reality suggests; overplacement signifies an investors' belief in their superiority compared to others; and overprecision denotes an unwarranted confidence in the accuracy of their information. Overprecision is significant not only because individuals generally have an aversion to uncertainty but also due to the perceived expectation from others to provide precise point estimates (Moore, 2020).

The phrase "social media influencer" is utilized to describe those individuals who exert a noteworthy impact on social media networks by fostering and sustaining relationships with a vast audience. Social media influencers have ability to entertain, inform, and greatly influence the attitudes, behaviors, and thoughts of their followers (AlFarraj et al., 2021). This credibility is measured using the dimensions proposed by Ohanian (1990), which consist of attractiveness, expertise, and trustworthiness (AlFarraj et al., 2021). Another study demonstrated that these factors influence followers' purchase intentions, highlighting the significance of these three indicators as sources of influencer characteristics (Vrontis, Makrides, Christofi, & Thrassou, 2021). The topic of influencer credibility carries great importance in scholarly discussions on social media influencers.

The concept of fundamental information pertains to the data obtained by investors through the intrinsic value or fair value approach of a stock, wherein the analysis provides insights into whether the stock is undervalued (underpriced) or overvalued (overpriced) (Elbialy, 2019). Elbialy (2019) says that fundamental information can be approached in two ways: top-down analysis and bottom-up analysis. The former involves examining the economic conditions, industry trends, and organizational conditions to assess the fair value of the stock. Conversely, the latter begins by analyzing specific company stocks and then assessing the industry environment and economic conditions to determine the fair value of the stock.

Key indicators used to assess fundamental information include the fundamental economic data of a country, industry analysis data, and the company's fundamental financial data to gauge financial performance (Vuković, Pivac, & Babić, 2020). The fundamental economic data encompasses macroeconomic factors such as GDP growth, inflation rates, and others, providing insights into the overarching economic conditions and their impact on the stock market (Indrayono, 2022). Investors can make good investment decisions through the use of quality financial reports (Hung et al., 2023).

The effectiveness of technical analysis in forecasting stock market trends remains a contentious issue within academic and research circles. While Yashina, Kashina, Yashin, Pronchatova-Rubtsova, and Khorosheva (2022) advocate for its potential, especially during financial downturns, by highlighting its ability to enhance investment strategies using their developed tools and that it can offer short-term gains, its profitability tends to diminish during periods of financial instability in the U.S. market (Sermpinis, Hassanniakalager, Stasinakis, & Psaradellis, 2019), critics such as Alhashel and Almudhaf (2021) and Karki, Dahal, Bhattarai, Balla, and Lama (2023), express skepticism and they emphasize its potential subjectivity and challenge its foundational principles.

Kubińska, Czupryna, Markiewicz, and Czekaj (2016) and Lee, Chang, Hung, and Chen (2021) highlighted methods by providing the basis for measuring the application of technical data. These encompass: (1) the incorporation of basic technical analysis details like support/resistance and trendline in decision processes; (2) the application of intricate technical analysis patterns such as head and shoulder, double bottom, and so forth in decision-making; and (3) the utilization of technical analytical indicators like the Relative Strength Index (RSI), Moving Average (MA), Moving Average Convergen Divergen (MACD), and others.

In summary, fundamental information involves analyzing the intrinsic value or fair value of stocks, while technical information relies on studying past price data. These two forms of information, though approached differently, offer valuable insights for investors in making informed investment decisions. By considering both fundamental and technical analysis, investors can develop a comprehensive understanding of the market and enhance their investment strategies.

In the realm of stock trading, particularly in Indonesia, there exists an intriguing concept known as bandarmology analysis. The term "bandarmology" refers to the observation of market makers' activities in accumulating and distributing stocks in the stock market, as well as their control over stock prices. This concept posits that stock price movements are not random but rather controlled by a force known as "bandar," or the market maker. These market makers wield full control over stock prices, regardless of whether the market is trending upward, downward, or stagnant (Czupryna, 2022).

The fundamental principle of bandarmology analysis lies in the following the footsteps of market makers by studying their transaction behavior. This analysis serves as a valuable source of information for investors in making stock purchase decisions (Filbert, 2016). Although the development of bandarmology analysis has been rapid and has been embraced by individual investors, scholarly research on this topic remains limited.

Bandarmology analysis is intriguing and warrants further investigation as it can provide a significant source of information for investors engaging in stock market trading. Several indicators are used to assess the utilization of bandarmology information, including: (1) stockbroker transactions as decision-making indicators; (2) stock accumulation and distribution as decision-making indicators; (3) foreign flow as a decision-making indicator; and (4) the belief that stock prices are controlled by bandars or market makers.

By paying attention to and studying bandarmology analysis, investors can gain deeper insights and develop better investment strategies. Although there are limitations to conducting in-depth research on this topic, bandarmology analysis holds promising potential for further exploration in the context of stock market trading.

3. Materials and Methods

According to Arora (2017) and Reethesh et al. (2019), the preparation of the questionnaire follows established procedures and accepted methodologies. This process encompasses construct development, construct validation, pre-survey, and assessment of construct validity and reliability. Following Arora (2017), description of the qualities of a well-designed questionnaire, the questionnaire's construction employs writing strategies that are in line with those characteristics. It is important that the design of this questionnaire does not require ethical approval for survey research; we ensured that ethical issues were properly addressed during the data collection process.

Table 1. The development stage of the aggressive investor behavior questionnaire.

Stages	Activity	Method	Number of questionnaire items	Extra / Reduction
I	Construct development	Literature review	60	
II	Construct development	FGDs	67	Addition 7 item
III	Construct validation	Practitioner and academic interview	52	Subtraction 17 Item
IV	Pre-survey	Pilot test	52	-
V	Build construct validity and reliability	Item analysis and factor analysis	52	-

The preparation of this questionnaire involves a systematic process consisting of the following stages:

3.1. Stage 1: Construct Development

The systematic preparation and development of this questionnaire involve several activities: a literature review, conducting focus group discussions (FGDs), evaluation by practitioners and academics, conducting pre-surveys, and establishing construct validity and reliability. These stages are summarized in Table 1.

Literature review: The literature review process utilizes search engines such as Google Scholar and Scopus to obtain a comprehensive understanding of the variables under study, particularly aggressive investors, overconfidence, social media influencers, fundamental information, technical information, and bandarmology information. The search process employs keywords such as "investor aggressiveness," "market order," "order submission choice," "overconfidence," "market maker analysis," "bandarmology," "stockbroker activity," "fundamental information," "accounting information," "technical information," "influencer," "social media," and "social media influencer." The search results yield 85 relevant articles, from which questionnaire items are derived, resulting in 60 statement items.

Focus Group Discussion (FGD): FGDs are conducted with finance and investment experts, involving 5-6 participants. The FGD sessions last for 60 minutes and result in the addition of seven questionnaire items.

The literature review and FGD outcomes contribute to a total of 67 statement items presented in the questionnaire. The questionnaire is prepared in Indonesian, ensuring participants' ease of understanding and adherence to the guidelines for questionnaire statement item preparation, as suggested by Arora (2017). The questionnaire uses a 5-point Likert scale.

Practitioner's evaluation: The subsequent step in questionnaire development involves evaluation by capital market practitioners and psychologists regarding the behavioral biases examined in this study. The evaluation process leads to a reduction of 16 questionnaire statement items, resulting in a total of 52 items, comprising 12 items pertaining to respondents' characteristics and 40 items related to investor behavior perceptions.

Pre-Survey: The 52 prepared questionnaire items are subjected to a pilot study involving 40 respondents. The pre-survey questionnaires are distributed through Google Forms, and participants are instructed to complete the questionnaires accordingly.

3.2. Stage 2: Questionnaire Validity and Reliability

After distributing the questionnaires in the pre-survey to 40 respondents, statistical analysis is performed to test the validity and reliability of the questionnaire. The Pearson correlation between each item and item score in a given variable serves as the basis of the validity test's factor analysis. A correlation value above 0.30 indicates acceptable validity. The reliability of measurement items is evaluated using Cronbach's Alpha, with a minimum value of 0.70 denoting reliability.

3.3. Stage 3: Statistic Analysis

Based on the initial analysis of the responses from the 40 respondents, the results indicate acceptable levels of validity and reliability. A Pearson correlation above 0.30 indicates that each item measures a variable with a validity level, confirming the accuracy of the measurement items. The reliability analysis using Cronbach's Alpha demonstrates overall consistency and reliability of the item measurements. Consequently, the measurement tools utilized in the pre-survey exhibit validity and can be relied upon as survey instruments to be administered to all research respondents.

Along with the preliminary analysis, this study uses confirmatory factor analysis (CFA) to fine-tune the measurement model and make sure that the survey's observed variables match what the researcher knows about the nature of the construct or factor. CFA was conducted on a sample of 324 investors to facilitate the testing of hypotheses regarding the relationships between observed variables and their latent constructs.

The methodology we employ aligns closely with established methods, showing no significant deviations. It's crucial to highlight that this standardized procedure is not only determinate but also widely acknowledged by scholars, researchers, and practitioners (Kumari et al., 2020). This method is particularly effective in crafting high-quality questionnaires, especially in this study aimed at understanding aggressive investor behavior. Its broad application and acceptance demonstrate its capacity to yield consistent and reliable results, making it an invaluable tool for academics, regulators, and capital market practitioners.

4. Results

4.1. Preliminary Analysis

The tested questionnaires are provided in Appendix A. These validated questionnaire items can be freely utilized for future research on testing aggressive investor behavior. The descriptive statistics of the respondents based on the questionnaire results are presented in the following table:

Table 2 presents a total of 324 respondents who are participating in completing the questionnaire. The majority of respondents are men, comprising 71%, while women account for 29%. Geographically, the distribution of respondents is as follows: 46% are from the islands of Java, Bali, Nusa Tenggara Timur (NTT), and Nusa Tenggara Barat (NTB); 21% are from Sumatra; 10% are from Sulawesi and Maluku; 9% are from Kalimantan; and 4% are from Papua (Irian Jaya). In terms of age categories, the results indicate that 46% of respondents are aged 21-30 years, 32% are aged 31-40 years, 13% are aged 41-50 years, 6% are under 20 years old, and 1% are 60 years and older. Regarding educational background, the majority of respondents hold undergraduate degrees (52%), followed by master's degrees (24%), upper education (19%), and doctoral degrees (3%).

4.2. Confirmatory Factor Analysis (CFA)

CFA was used for accurate and consistent measurement of research indicators and establishing variable constructs. CFA evaluates the measurement model by examining the causal relationships between variables and measurement items. The evaluation of CFA involves assessing the loading factor with a threshold value of 0.70, Construct Reliability of 0.70, and Variance Extracted of 0.50 (Hair, Hult, Ringle, & Sarstedt, 2017; Kim, Ku, Kim, Park, & Park, 2016; Kishor, 2022; Schreiber, Stage, King, Nora, & Barlow, 2006). To ensure research validity, we conducted a discriminant validity analysis by comparing variable correlations with the square roots of the Average Variance Extracted (AVE), following (Sekaran & Bougie, 2011).

Table 2. Characteristics of respondents.

Gender	Frequency	%	Investment experience	Frequency	%
Man	169	52%	12 years old	141	44%
Woman	155	48%	< 1 Year	131	40%
Total	324	100%	35 years old	42	13%
Age	Frequency	%	6 - 10 Years	5	2%
21-30 years	154	48%	> 10 Years	5	2%
< 20 years	89	27%	Total	324	100%
31-40 years	55	17%	Income	Frequency	%
41 - 50 years	22	7%	0 - 5,000,000.	178	55%
51 - 60 years	2	1%	5,000,000 - 10,000,000	98	30%
> 60 years	2	1%	11,000,000 - 25,000,000	37	11%
Total	324	100%	50,000,000 - 100,000,000	6	2%
Marital status	Frequency	%	26,000,000 - 50,000,000	5	2%
Single	219	68%	Total	324	100%
Marry	100	31%	Investment amount	Frequency	%
Widow widower	5	2%	1,000,000 - 10,000,000	167	52%
Total	324	100%	11,000,000 - 25,000,000	51	16%
Education	Frequency	%	0 - 1,000,000	43	13%
Bachelor degree	147	45%	26,000,000 - 50,000,000	26	8%
Upper education	122	38%	51,000,000 - 100,000,000	19	6%
Masters/S2	43	13%	101,000,000 - 500,000,000	11	3%
Doctoral/S3	6	2%	500,000,000 - 10,000,000,000	7	2%
Middle education	6	2%	Total	324	100%
Total	324	100%	Investment choice products	Frequency	%
Religion	Frequency	%	Conventional	185	57%
Islam	212	65%	Combination (Mixed)	92	28%
Christian protestant	49	15%	Sharia	47	15%
Catholic Christian	44	14%	Total	324	100%
Buddha	11	3%	Transaction frequency	Frequency	%
Hindu	7	2%	Every day (Often);	116	36%
Stream of faith	1	0%	2-3 times a week;	78	24%
Total	324	100%	2-3 times a month;	53	16%
Domicile	Frequency	%	once time a week;	46	14%
Java, Bali, NTT and NTB	212	65%	Once a month (Sometimes);	31	10%
Sumatra	64	20%	Total	324	100%
Borneo	25	8%			
Sulawesi and Maluku	16	5%			
Irian Jaya	7	2%			
Total	324	100%			

The assessment of Confirmatory Factor Analysis (CFA) can be observed in Figure 1, revealing that all items within each research variable exhibit loading factor values above 0.70, construct reliability values above 0.70, and convergent validity with variance extracted (VE) values above 0.50. Based on these findings, it can be concluded that all indicators and research variables demonstrate validity and reliability, rendering them suitable for further estimation and analysis.

Furthermore, the evaluation of discriminant validity from the data processing results is presented in Table 3. The diagonal values in the table represent the VE root of each variable, which should exceed the correlation value between variables (Sekaran & Bougie, 2011). Table 3 demonstrates that the VE root value for the Fundamental Information (FI) variable is 0.796, surpassing the correlation values with the IT variable (0.787) and the IB, IMS, and OC variables. Hence, the discriminant validity for the Fundamental Information (IF) variable is confirmed. Similarly, the VE root value for the Technical Information (TI) variable is 0.788, exceeding the correlation values with the IB variable (0.745), IMS variable (0.780), and OC variable (0.656), satisfying the discriminant validity requirements. Moreover, the VE root value for the Bandarmology Information (BI) variable is 0.815, surpassing the correlation values with the IMS variable (0.752) and the OC variable (0.626), confirming the discriminant validity of the Bandarmology Information (IB) variable.

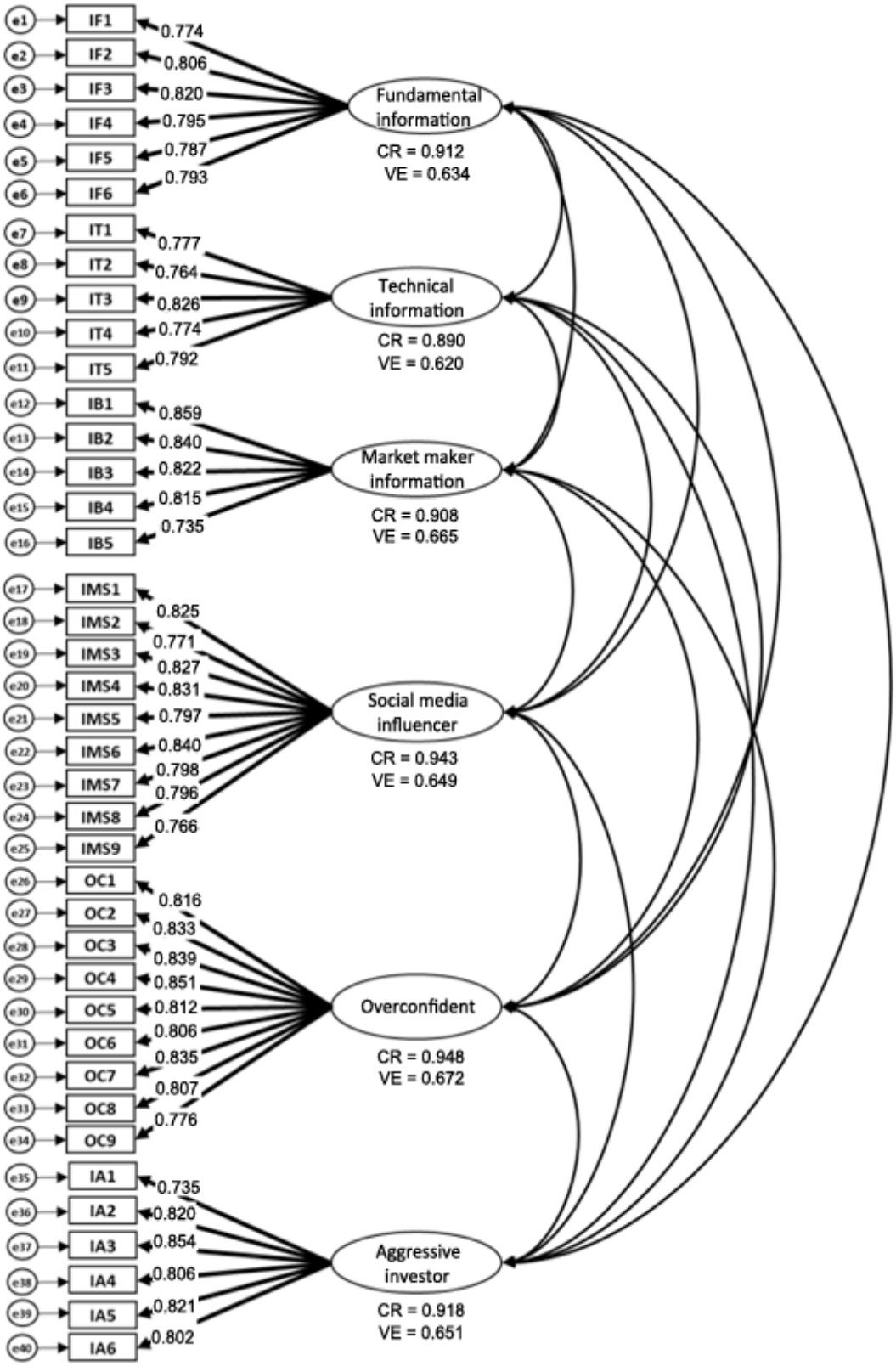

Figure 1. Result of confirmatory factor analysis (CFA) of aggressive investor behaviour.

Additionally, the VE root value for the Social Media Information (SMI) variable is 0.832, surpassing the correlation value with the OC variable (0.683), satisfying the discriminant validity for the Social Media Information (IMS) variable. These findings indicate that the variables utilized in this study have undergone theoretical and statistical testing.

Table 3. Evaluation of discriminant validity.

Variable	FI	TI	BI	SMI	OC
FI	0.796*				
TI	0.787	0.788*			
BI	0.556	0.745	0.815*		
SMI	0.605	0.780	0.752	0.832*	
OC	0.536	0.656	0.626	0.683	0.832*

Note: * Diagonal value is VE root, Min is Minimum, Max is Maximum, FI is Fundamental information, TI is technical information, BI is Bandarmology information, SMI is social media influencer, OC is Overconfident.

Based on the CFA calculations, the Goodness of Fit test results were obtained. The detailed results of the goodness of fit test for the measurement model can be observed in Table 4.

Table 4. Goodness of fit full model test.

GoF size	Estimate	Standard	Information
Satorra-Bentler scaled Chi-square / Degrees of freedom	1267,5 / 725 = 1.748	2.00	Good fit
Root mean square error of approximation (RMSEA)	0.048	≤ 0.08	Good fit
Root mean square residual (RMR)	0.0346	≤ 0.05	Good fit
Standardized RMR	0.0431	≤ 0.05	Good fit
Normed fit index (NFI)	0.978	≥ 0.90	Good fit
Non-Normed fit index (NNFI)	0.990	≥ 0.90	Good fit
Comparative fit index (CFI)	0.990	0.90	Good fit
Incremental fit index (IFI)	0.990	0.90	Good fit
Relative fit index (RFI)	0.976	0.90	Good fit

Table 4 displays the values of RMSEA, RMR, GFI, AGFI, NFI, NNFI, CFI, IFI, and RFI, all of which meet the required standards for assessing the goodness of fit. Consequently, the research can proceed to the next stage. In terms of the criteria for absolute goodness of fit, the fit indices of RMSEA, RMR, SRMR, and the ratio of Chi-Square to the degree of freedom (DF) indicate an acceptable fit. Empirical data backup the suggested measurement model. However, other absolute goodness of fit measures, such as the p-value of the chi-square test, GFI, and AGFI, suggest a poor fit. Hooper, Coughlan, and Mullen (2008) mention that these measures tend to be sensitive to factors such as sample size, model complexity, and data abnormalities.

Plus, the suggested measurement model (CFA), fits the data well according to the increasing goodness of fit measures, which show that NFI, NNFI, RFI, IFI, and CFI are all greater than 0.90.

5. Discussion

Generally, investor decision-making revolves around the process of making purchase or sale decisions. Numerous research studies have focused on examining the decision-making process related to buying or selling. Simultaneously, the advancement of technology and capital markets has given rise to a conceptual understanding of how the stock market operates, particularly within the realm of market microstructure. The study of market microstructure extensively explores this operational aspect. Theoretical frameworks within market microstructure can be broadly categorized into two types: market orders and limit orders. Market orders involve selling or buying at the best available bid or offer, whereas limit orders involve setting a price threshold and queuing for execution until the price reaches the desired level.

Consequently, the integration of investment decision-making with the concept of market microstructure has led to the examination of buying and selling decisions through either limit orders or market orders. Aggressive investors are characterized by their preference for market orders when executing transactions, while non-aggressive investors, often referred to as patient investors, opt for limit orders (Chiu et al., 2017; Hung et al., 2015; Lee et al., 2020).

In this study, we aimed to assess the suitability of the prepared questionnaire for our research. A total of 52 questionnaire items were developed in a simple and structured manner and underwent preliminary testing. This study represents the first attempt to validate a questionnaire that assesses aggressive investor behavior and the factors influencing it, such as overconfidence, social media influencers, fundamental information, technical information, and market maker information (bandarmology). Among these variables, two variables, namely aggressive investor behavior and market maker information (bandarmology information), have not previously been developed into questionnaire items due to the reliance on secondary data in previous research studies. The development of these two variables involved collecting insights from literature reviews,

conducting focus group discussions (FGDs), formulating questionnaire items for evaluation by practitioners, and subsequently conducting pilot testing. The remaining variables, namely fundamental information, technical information, overconfidence, and social media influencer information, were adapted from previous literature sources with necessary modifications.

6. Conclusion

The development of a questionnaire to assess aggressive investor behavior and its associated factors is a pivotal contribution to this research. This questionnaire is meticulously designed based on scientific principles and has been validated, specifically to facilitate stock investors in countries with order-driven market systems. Upon conducting a Confirmatory Factor Analysis (CFA), the questionnaire's capability to evaluate aggressive investor behavior and its determinants has been proven to be both valid and reliable. This instrument introduces a novel approach to modeling aggressive investor behavior and lays the foundation for future research on the decision-making processes of aggressive investors, grounded in the utilization of diverse information sources and behavioral biases. Although this questionnaire has a broad application, adjustments might be necessary to cater to specific regional contexts. Subsequent research should take into account these regional nuances and tailor the questionnaire accordingly to ensure its relevance and applicability.

The research's implications offer valuable insights for scholars and financial institutions keenly interested in finance research. Furthermore, in the spirit of parsimony, the questionnaire is designed to be user-friendly, ensuring that respondents can easily understand and engage with it.

The questionnaire proves invaluable in gauging the aggressiveness of stock investors in the capital market and in identifying the information sources they rely upon during their decision-making processes. It is available for use by academics, policymakers, and financial institutions to study aggressive investor behaviour.

A future study may also design and develop a questionnaire for non-aggressive or passive investor behavior. This aims to broaden the research insights and provide a more in-depth theoretical framework for understanding both aggressive and non-aggressive investor behaviors.

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Appendix A. The aggressive investor behavior questionnaire.

Variable		Source
Fundamental information (FI)		
IF1	I believe economic growth rate (GDP) information is needed in making stock purchase decisions.	Kubińska et al. (2016); Lai, Lo and Lai (2001); Wijayant Nuranyanto, and Abiprayu (202 and Elbialy (2019).
IF2	I believe interest rate information is needed in making stock purchase decisions.	
IF3	Company industry analysis information (Industry prospects) is required in the decision to purchase shares.	
IF4	Information on the company's industrial lifecycle analysis (Lifecycle industry) is required in making stock purchase decisions.	
IF5	Financial ratio analysis information is needed in making stock purchase decisions as a measure of the performance and success of a company.	
IF6	I believe the use of fundamental information can make a profit on the stock market.	
Technical information (TI)		
IT1	I believe technical analysis information can make a profit in stocks.	Kubińska et al. (2016) and Lai et al. (2001).
IT2	I used support/resistance line analysis information on the stock price chart in making stock purchase decisions.	
IT3	I use pattern analysis information on stock price charts (Example: head and shoulder, double bottom, etc.) on stock buying decision.	
IT4	I use Technical Indicator Information Analysis (Relative strength index (RSI)/Moving average (MA)/Bolinger band. dll) on stock buying decision.	
IT5	Technical Analysis helps me in decision making.	
Bandarmology information (BI)		
IB1	Information on the analysis of stock broker transactions in the secondary market is a consideration for me in making stock purchase decisions.	Filbert (2016) and Karo-karo (2017), FGDs, Practitioner Evaluation.
IB2	Information on the accumulation and distribution by market makers on a stock is a consideration for me in making a share purchase decision.	

Variable		Source
IB3	Information on the accumulation and distribution of foreign flows is a consideration for me in making a share purchase decision.	
IB4	Information on transactions made by the stockbroker (MG, ZP, YP dll) on the previous day it was a consideration for me in making a share purchase decision.	
IB5	I believe shares price are controlled by market makers.	
Social media influencers (SMI)		
IMS1	I feel I have a "closeness" to social media Influencers	Ohanian (1990); Amos, Holmes, and Strutton (2008) and Vrontis et al. (2021)
IMS2	I feel so fond of this social media influencer.	
IMS3	I feel like I have a common mind with these social media influencers.	
IMS4	Social media influencers can be relied upon for the information conveyed.	
IMS5	Social media influencers are honest in the delivery of information.	
IMS6	Social media influencers can be trusted with the information submitted.	
IMS7	Social media influencers have expertise in their field.	
IMS8	Social media influencers are very experienced in their fields.	
IMS9	Information from social media influencers can influence pre-existing beliefs/information.	
Overconfident (OC)		
OC1	I believe in the success of the transaction plan (trading plan).	Moore and Healy (2008) and Khan et al. (2017)
OC 2	The success of investing in the past is due to my ability and knowledge.	
OC 3	Investment success is due to the correctness of the information I have about stocks.	
OC 4	I have the ability to choose stocks better than other investors.	
OC 5	I believe in making a profit in the capital market.	
OC 6	Risky investment is the best choice for profit.	
OC 7	I am able to choose stocks that have the possibility of rising prices in the future.	
OC 8	My stock investment performance, much better than the average of other investors.	
OC 9	My investment experience is better than the average investor.	
Aggressive investor behavior (AIB)		
PIA1	I believe that buying stocks is a high risk investment.	Biais, Hillion, and Spatt (1995); Bian, Chan, Shi, and Zhou (2018); Ma, Lin, and Chen (2008); Tseng and Chen (2015); Chiu et al. (2017); Hung et al. (2015); Lee et al. (2020); Rzayev and Ibikunle (2021) and Pompian (2016) FGDs, practitioner evaluation.
PIA2	I occasionally use a market order when buying shares, during the closing session of the stock exchange trading hours (14.30-15.15).	
PIA3	I occasionally use market orders when buying shares, during the opening session of the stock exchange trading hours (09.00-09.30).	
PIA4	I believe the use of market orders is the best choice when trading frequency is high.	
PIA5	I believe the use of market orders is the best choice when the volatility (up and down) of the market price is high.	
PIA6	I believe the use of market orders can increase the potential for profit.	