

Profile of Risk Adventurous South African Investors Using Structural Equation Modeling

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Abstract:

Financial environments are becoming increasingly complex, paired with decisions involving greater risk. Due to this complexity, investors who are not usually willing to take on higher risks are urged to be more adventurous in their risk-taking behaviors to achieve desired investment outcomes. This study aims to profile risk adventurous South African investors through a structural equation model based on endogenous and exogenous factors that could influence investors' risk tolerance behavior. The non-probability purposive sampling method was used to filter individual investors from an investment company. The sample size of 463 individual investors was considered adequate for quantitative data analysis. This risk profiling model makes a notable and exclusive contribution to the field of study and the financial industry. It enables individual investors to make informed investment decisions in line with their investment goals and objectives. Consequently, financial practitioners can profile the risk tolerance behavior of adventurous investors more accurately in a complex financial environment.

Keywords: risk tolerance, behavioral finance, risk profiling.

使用结构方程模型分析南非风险冒险投资者的概况

摘要:

金融环境变得越来越复杂，决策的风险也越来越大。由于这种复杂性，通常不愿意承担较高风险的投资者被敦促在冒险行为中更具冒险精神，以实现期望的投资结果。本研究旨在通过基于可能影响投资者风险承受行为的内生和外生因素的结构方程模型来描述具有风险冒险精神的南非投资者。采用非概率立意抽样方法从投资公司中筛选个人投资者。463名个人投资者的样本量被认为足以进行定量数据分析。这种风险分析模型对研究领域和金融行业做出了显著且独特的贡献。它使个人投资者能够根据其投资目的和目标做出明智的投资决策。因此，金融从业者可以在复杂的金融环境中更准确地描述冒险投资者的风险承受能力。

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关键词：风险承受能力, 行为金融学, 风险分析。

1. Introduction

Financial environments are becoming increasingly complex, paired with decisions involving greater risk (Molina-García *et al.*, 2023). The global financial crisis (GFC) in 2007 impacted financial markets by causing extreme market volatility. The unexpected COVID-19 pandemic further impacted financial markets, leaving investors and financial practitioners with very few options other than to ride out the current market conditions. Because of several extreme market events over the years, investors have been forced to improve their understanding of the notion of risk (Ryack, 2011; Du Plessis, 2015). Although risk can be described in theoretical terms, an individual's inherent perception and comprehension of the relationship between risk and return is somewhat refined by their experiences in life (Crouhy *et al.*, 2014). A fundamental aspect to consider when making investment decisions is an investor's willingness to take on risk. The risk-taking behavior of investors is crucial to their individual life outcomes because it influences almost all financial decisions (Molina-García *et al.*, 2023). Grable (2000) affirmed that risk tolerance is the highest level of uncertainty or volatility in investment returns that individuals are prepared to take when making an investment decision. However, Botha *et al.* (2012) defined risk tolerance as an individual's emotional acceptance of volatility or the attitude toward experiencing a loss. Due to complex and volatile markets these days, investors not usually keen to take on higher risks are urged to be more adventurous in their risk-taking behaviors to achieve desired investment outcomes.

Therefore, investors expect financial practitioners to help them make successful financial and investment decisions. Furthermore, financial practitioners operate in a financial environment where it is legally enforced to be informed of their client's financial, attitudinal, and emotional circumstances when making recommendations regarding financial and investment decisions. The measurement and evaluation of risk tolerance are key requirements for successful and sound financial and investment planning (Roszkowski & Davey, 2010). Irrespective of the type of investment being considered, the risk-taking propensities of investors should be established before developing an investment strategy (Mayadunne & Park 2016; Louw, 2017). Risk assessment forms are used by financial practitioners to measure the risk tolerance of investors. However, a lack of regulatory guidance on risk profiling in the financial industry has resulted in a diverse approach to risk profiling evaluations. Consequently, the existing and conventional risk assessment forms used by practitioners in the financial industry have

major shortcomings, as they are not comprehensive enough to consider all the factors that can affect the risk tolerance behavior of investors when making investment decisions. Therefore, risk assessment forms can be improved by recommending a framework that provides for client-specific questions by considering several pre-identified endogenous and exogenous factors that influence investor risk tolerance behavior. This research article focuses on improving the profiling of the risk tolerance behavior of adventurous investors in South Africa. Consequently, the primary objective of this research article was to construct a model to profile the risk tolerance behavior of adventurous investors based on endogenous and exogenous factors. The following section provides a conceptual framework for the various endogenous and exogenous factors that may influence the risk-taking behavior of adventurous investors.

2. Literature Review

Investors' ability to accept risk when making financial investment decisions is known as financial risk tolerance (FRT). Financial practitioners focus on understanding a client's risk profile using general risk assessment measures to estimate FRT before giving financial advice (Thanki & Baser, 2021). The willingness of investors to tolerate risks should be a key to constructing suitable investment plans, which assist investors and financial advisors in constructing the most optimal asset allocation for the individual investor (Klement, 2015). Hence, FRT is the most important factor in investors' choice of competing investment options suggested by financial advisors (Thanki & Baser, 2021). Investors have different levels of willingness to accept risks, which can be classified into different risk tolerance categories (Goodall, 2005). During the life cycle of an investor, numerous financial and investment decisions occur, which are influenced by the investor's FRT level (Van den Bergh, 2018). Variables such as gender, age, income, and investment objectives and constraints are among the general factors that can influence investors' willingness to take risks (Hemrajani *et al.*, 2021).

According to Van den Bergh (2018) and Karki and Kafle (2020), investor risk profiles range from conservative, moderately conservative, moderately aggressive, and aggressive. Moderately aggressive and aggressive investors thrive on adrenaline rushes in the financial world (Discovery, 2019a). These investors will take a financial risk in the short term similar to rolling a dice with the hope of earning long-term returns. These investors often find themselves in what can be described as a "financial roller coaster" with the

anticipation of a thrilling ride for the next five to ten years. Contrary to more conservative (low risk profile) investors with income or liquidity preferences, moderately aggressive and aggressive investors prioritize capital appreciation, aiming to increase the real value of their investment portfolios (Australian Investors Association, 2020).

Moderately aggressive (growth) investors, as stated by Discovery (2019a), have the capacity to tolerate above-average risks and fluctuations in returns over the short term, driven by their anticipation of higher long-term returns over a period of five to ten years. According to Goodall (2005), the investment portfolios of these individuals typically comprise a mix of asset classes, but they exhibit a strong inclination toward higher-risk investments, particularly in equities. As per Discovery (2019a), aggressive investors exhibit a willingness to endure substantial fluctuations in returns over the short term, driven by their pursuit of achieving the highest possible long-term returns, typically spanning ten years or more. As emphasized by Marx *et al.* (2010), aggressive investors are commonly found among young individuals in the early stages of their careers and in the accumulation phase of the investor life cycle. This demographic demonstrates a greater inclination to tolerate significant risks to outperform the financial markets and allocate substantial funds to their investment portfolios over an extended period (Tools for Money, 2018). Given their readiness to embrace considerable risk levels, aggressive investors focus their investment portfolios on growth-oriented and high-risk assets such as national and international equities while maintaining a minimum cash reserve for liquidity requirements. It is worth noting that a long-term time horizon of ten years or more enables aggressive investors to recover from any potential financial losses that may occur (Goodall, 2005).

The risk tolerance behavior of moderately aggressive and aggressive investors to take on high risks is influenced by numerous factors. These factors can be summarized into two categories: endogenous and exogenous factors (van den Bergh-Lindeque, 2020). It is important for investors and financial practitioners to understand these factors because they have a significant impact on investors' investment decisions (Van de Venter *et al.*, 2012; Grable, 2016). The endogenous and exogenous factors that influence investor risk tolerance behavior are illustrated in Figure 1.

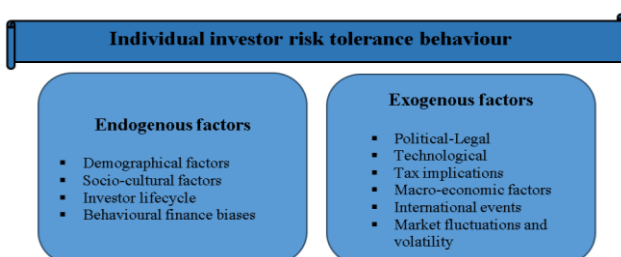


Figure 1. Endogenous and exogenous factors influencing investor

risk tolerance behavior (Developed by the authors)

The endogenous and exogenous factors that influence the risk tolerance behavior of adventurous investors are discussed in the following subsections.

2.1. Endogenous Factors

The risk tolerance behavior of adventurous investors is influenced by several endogenous factors, which are inherent characteristics or personality elements unique to these investors (Grable & Joo, 2004). Endogenous factors, namely demographical factors, socio-cultural factors, investor life cycle, and behavioral finance biases, that can influence the risk tolerance behavior of adventurous investors are addressed below.

- Demographical factors refer to statistical data on the socioeconomic characteristics of a population (Merriam-Webster Dictionary, 2023). Demographical factors such as age, gender, education, income, net worth, household size, and number of financial dependents should be considered when examining the risk tolerance behavior of adventurous investors (Irwin, 1993; Grable, 2016; van den Bergh-Lindeque, 2020).

- Socio-cultural factors refer to the differences between groups of individuals based on the social class and society in which they live (Cambridge Dictionary, 2023). Socio-cultural factors, such as financial and investment knowledge, religion, and health status, should be considered when examining the risk tolerance behavior of adventurous investors (van den Bergh-Lindeque, 2020).

- The investor life cycle shows the investment behavior of investors throughout the different phases of their lives based on age and time horizon (Cocco *et al.*, 2005; Shaikat, 2020). It is believed, based on the notion of the investor life cycle theory, that investors become less risk adventurous as they age and have less time to recover possible losses (Marx *et al.*, 2010). According to Reily and Brown (2012), investors can be categorized into one of the four phases of the life cycle at a certain point in their lifetime, namely, the accumulation phase, the consolidation phase, the spending phase, and the gifting phase. In this research article, the investor life cycle is categorized into two categories: the growth investor phase and the defensive (cautious) investor phase (van den Bergh-Lindeque, 2020).

- Behavioral finance biases examine how the unpredictable nature of human psychology influences investment decision-making (Rossini & Maree, 2015). Behavioral finance consists of three elements: knowledge of finance, economics and cognitive psychology (Lintner, 1988; Zindel *et al.*, 2014). The psychology of risk relates to the mental processing that investors undertake to perceive, evaluate, and respond to risks. This includes both cognitive and emotional processes whereby investors' decisions are vastly influenced by social and cultural factors. Numerous

612 behavioral finance biases affect investors' thinking and perception of risk when making investment decisions (Asher, 2023). These behavioral finance biases, as described in Table 1, influence the risk-taking behaviors of adventurous investors.

Table 1. Behavioral finance biases (Kannadhasan, 2006; Byrne & Brooks, 2008; Mazzoli & Marinelli, 2011; Subash, 2012; Zindel et al., 2014; Pompian, 2016; Dickason, 2017; Ferreira, 2018)

Behavioral finance bias	Description
Representativeness	Investors seek to find patterns in a series of random events. They classify new information and make investment decisions based on their perceptions of past experiences or known events
Anchoring	Investors tend to rely too profoundly on a single piece of information when making investment decisions despite the fathomless information available.
Gambler's fallacy	Investors inaccurately predict financial market movements because they base their investment decisions on future market trends. They are also under the perception that errors in random events are self-correcting.
Availability bias	Investors base their investment decisions on the most recently available information.
Loss aversion	Investors tend to avoid losses rather than achieve gains. Consequently, they tend to hold onto non-performing investments with the expectation that investments will produce positive returns in the future.
Regret aversion	Investors tend to manage situations to avoid feelings of regret or embarrassment when reporting a loss because of poor investment decisions.
Mental accounting	Investors group information about certain events and track gains and losses concerning investment decisions in separate mental compartments.
Self-control	Investors exercise self-control to lessen the temptation to take greater financial risks to avoid substantial financial losses and protect their investments.

Pompian (2016) found that risk adventurous investors are primarily driven by behavioral finance biases, such as self-control, affinity, overconfidence, outcome, and illusion of control biases. Risk adventurous investors show overconfidence in their own investment decision-making abilities and tend to believe that they can control investment outcomes. Dickason and Ferreira (2018a) found that risk adventurous investors are primarily driven by self-control bias.

2.2. Exogenous Factors

The risk tolerance behavior of adventurous investors is influenced by several exogenous factors, which are factors or events related to the external environment that may bring about changes and fluctuations in financial markets (Kuzniak & Grable, 2017; van den Bergh-Lindeque, 2020). The exogenous factors, namely political-legal factors, technological factors, tax implications, macroeconomic factors, market fluctuations and volatility, and international events that can influence the risk tolerance behavior of adventurous investors are addressed below.

- *Political-legal factors:* they take on new and different forms. Governments face income inequalities and high levels of sovereign debt in advanced economies. As stated by De Kock (2014), certain political-legal events impact financial markets over the short term. Hence, investors should concentrate on and remain focused on their long-term investment goals and decisions. Political-legal events will occasionally occur and are attributed to the complexity of financial markets. Investors and financial practitioners should comprehend these factors to remain calm and make rational investment decisions during periods of uncertain political-legal circumstances. This will assist

them in entering and navigating new markets (Chester, 2016).

- *Technological factors:* The rise and advancement of technology is the most competitive trend in the financial industry. Financial advice is presented more strategically, professionally, and compliantly. Technology provides improved communication and distribution channels between investors and financial practitioners, enabling financial practitioners to obtain more insight into the needs and preferences of investors. Investors and financial practitioners also have access to fathomless information on investments and financial markets through various communication and distribution channels, such as mobile devices, computers, televisions, and the Internet, to stay informed of the most recent news in the financial markets (Rossini & Maree, 2015). The development of robo-advisers, automated online investment adviser services, may come as an opportunity or threat to the financial industry. Most robo-adviser services offer low costs, with some platforms offering free services or charging a fraction of the fees asked by financial planners. Yet, robo-advisers face the challenge of earning the trust and faithfulness of investors over the long term (Rossini & Maree, 2015). Van de Venter *et al.* (2012) found that investors who terminated their services with financial planners became more risk adventurous. Bernasek and Shwiff (2001) found that investors who are saving for retirement became more risk adventurous after they sought advice from financial planners.

- *Tax implications:* The effect of taxation on investments and the most tax-efficient investment choices in line with investors' goals and objectives should be considered when constructing an investment plan (Marx *et al.*, 2010; Discovery, 2018). Tax

implications on investments are different for each type of investment. An investment that produces a high return rate is not necessarily the best investment if it is subject to high capital gains tax (Old Mutual, 2018). Investors with high tax brackets should invest in tax-deferred investments to lessen the effect of taxation on their investment returns (Fischer & Gallmeyer, 2016). Witz and Zemon (2017) asserted that investors should have sufficient knowledge or acquire the assistance of financial planners to minimize the effect of taxation on investment returns when constructing an investment plan.

- *Macroeconomic factors:* The risk tolerance behavior of investors is influenced by macroeconomic factors in two ways. First, negative macroeconomic events reduce the financial abilities of investors, which causes them to be less risk adventurous. Second, the perceptions investors have toward macroeconomic factors and events, rather than the actual impact of these factors and events, influences their risk-taking behavior (Kuzniak & Grable, 2017). Macroeconomic factors such as interest rates, exchange rates, inflation, and gross domestic product (GDP) can influence the risk-taking behaviors of adventurous investors. Interest rates have a significant influence on the whole economy and investments, such as interest-bearing investments (Patel, 2019). Volatility in the exchange rates of countries influences trade and investment decisions and constrains a country's economic growth (Mavee & Schimmel-Pfenning, 2017). Inflation influences investments over the long term. Investors and financial practitioners should be observant of inflation over the long term as it can erode investment returns because investment returns on portfolios are less than the inflation rate (Coronation Fund Managers, 2019). Pettinger (2021) stated that high and volatile inflation brings about greater uncertainty regarding the cost of investments, and investors may fear that high inflation levels could result in economic uncertainty and future economic downturns. Countries with low and stable inflation over the long term experience higher rates of returns on investments. A healthy growth rate in the GDP of a country, signifying good economic performance, leads to a rise or positive effect on a country's stock market. Given investors' positive outlook on the economy, they are probably more risk-averse. The contrary is true when a country has a poor growth rate in GDP (Money Matters, 2023).

- *International events:* The risk tolerance behavior of investors is likely to be greatly affected by recent news about international events in financial markets (Hanna & Lindamood, 2007). Roszkowski and Davey (2010) established that when negative international events in financial markets occur, risk tolerance remains stable over the short term but tends to be affected over the long term. Schooley and Worden (2016) stated that investors' reactions toward negative international events in financial markets are much more

emotional.

- *Market fluctuations and volatility:* Financial markets are not strictly efficient or inefficient. Investors base their investment decisions on prediction, market timing, and financial performance. When investors make irrational investment decisions, it can lead to inefficiencies in the financial markets (Lintner, 1988). MacKillop (2003), as well as Guillemette and Finke (2014), found that investors become more risk adventurous during stock market upturns and less risk adventurous during stock market downturns. Malmendier and Nagel (2011) established that investors who experienced a stock market boom during their life cycle were more risk adventurous than investors who did not experience a stock market boom.

Given the complexity and ever-changing nature of financial markets, investors and financial practitioners should be mindful of changes in the external environment and the effect these changes can have on the risk tolerance behavior of adventurous investors. Knowledge of the endogenous and exogenous factors that influence the risk tolerance behavior of adventurous investors will assist investors and financial practitioners in taking advantage of opportunities and preparing for future challenges or risks. This section addresses the methodology employed in this study.

3. Methodology

The research question for this paper aimed to evaluate how endogenous factors, namely demographical factors, socio-cultural factors, the investor life cycle, and behavioral finance biases, and how exogenous factors, namely political-legal factors, technological factors, tax implications, macroeconomic factors, market fluctuations and volatility and international events influence the risk tolerance behavior of adventurous investors. Therefore, the primary objective of this paper was to construct a risk profile model that will assist financial practitioners in accurately profiling the risk tolerance behavior of adventurous investors.

3.1. Research Paradigm and Approach

A quantitative research approach was employed. An electronic questionnaire was used where the survey consisted of self-constructed and validated scales. A positivistic research paradigm was followed to challenge the traditional notion of "the absolute truth of knowledge". Dudovskiy (2016) specified that positivism holds that only reliable knowledge, based on experience and obtained using scientific methods, is truthful knowledge. The positivist research paradigm starts with the process of theory, the collection of data that supports or rejects the theory, and subsequently, the implementation of the necessary amendments before additional tests are performed (Creswell, 2003).

3.2. Research Sample Selection

The research population for this study included individual private investors from one of the largest private investment companies in South Africa. The inclusion criteria required individuals to be older than 18 years of age, to be a current private investor, and to live in Gauteng, the business hub of South Africa. The Gauteng province was chosen for this study because it comprises the largest portion of the South African population. As a result, every individual chosen to participate in this study did so with a purpose. Hence, this study used purposeful sampling, a non-probability sampling method that incorporates most characteristic and representative elements of the population (Babbie, 2010; Grinnell & Unrau, 2008). A final sample size of 463 individual investors ($n = 463$) was obtained and included in this research. Similar research studies, namely Sages and Grable (2010), Olweny et al. (2013), Shusha (2017), Dickason and Ferreira (2018b), Abdillah et al. (2019), and Shah et al. (2020), used comparable sample sizes. Accordingly, the sample size is adequate for this study.

3.3. Research Instrument and Reliability

Quantitative data were collected from individual investors of the South African investment company using an electronic questionnaire. For the dependent variable, the risk tolerance behavior scale was constructed based on theory and existing validated risk tolerance scales, namely the GL-RTS, SCF, and DOSPERT scales (Yao et al., 2004; Blais & Weber, 2009; Gilliam et al., 2010; Discovery, 2019b; Liberty, 2019; Sanlam, 2020; AMP, 2021). The construction of the new risk tolerance behavior scale was a primary contribution to the study to measure and report on the risk tolerance behavior of adventurous investors and how they will behave toward risk in various financial risk circumstances. Exploratory factor analysis (EFA) was used to identify financial risk events that influence the risk tolerance behavior of investors. The KMO and Bartlett's test of sphericity delivered satisfactory results for factor analysis. The KMO index value of 0.851 indicates great sampling adequacy as the value is greater than the minimum value of 0.5 (Malhotra et al., 2017). Bartlett's test of sphericity had an approximate chi-square statistic of 2757.082 with 136 degrees of freedom and was statistically significant ($p = 0.000 < 0.05$). This means that the variables are related and the data are suitable for factor analysis. The high-risk tolerance scale had a Cronbach's alpha value of 0.797, which indicates good reliability.

As the study focused on the risk profile of adventurous South African investors based on endogenous and exogenous factors, numerous demographical (age, gender, education, income, net worth, household size and number of dependents) and sociocultural (financial and investment knowledge) data

were collected. The demographical questions were constructed on the basis of previous research (Wallach & Kogan, 1961; McNish, 1982; Morin & Suarez, 1983; Hawley & Fujii, 1993; Roszkowski et al., 1993; Sung & Hanna, 1996; Grable & Joo, 2004; Grable et al., 2009; Yao et al., 2011; Dickason, 2017; Van den Bergh, 2018; Shah et al., 2020). The influence of sociocultural factors on investor risk tolerance behavior is a less studied factor. The socio-cultural questions were constructed based on previous research by Irwin (1993), Hammitt et al. (2009), and Yao et al. (2011).

The self-report on the investor life cycle comprises a self-constructed scale based on the investor life cycle theory (Marx et al., 2010; Reilly & Brown, 2012; Harty, 2014). EFA was used to identify the most significant statements that investors consider when establishing where they would describe themselves in the investor life cycle. The KMO and Bartlett sphericity tests generated satisfactory results for factor analysis. The KMO index value of 0.717 indicates good sampling adequacy as the value is greater than the minimum value of 0.5 (Malhotra et al., 2017). The Bartlett sphericity test had an approximate chi-square statistic of 1004.109 with 28 degrees of freedom and was statistically significant ($p = 0.000 < 0.05$). This indicates that the variables are related and that the data are suitable for factor analysis. Based on the newly developed self-report on the investor life cycle scale, investors were grouped into two categories: the growth investor phase and the defensive (cautious) investor phase. The growth investor category had a Cronbach's alpha value of 0.781, indicating good reliability, and the defensive (cautious) investor phase had a Cronbach's alpha value of 0.663, indicating fair reliability (Pallant, 2020).

The behavioral finance biases that risk adventurous investors are subject to were tested using validated scales constructed by Dickason (2017) and Ferreira (2018). These scales encompass statements derived from theory and were used to identify and analyze the effect of behavioral finance biases as endogenous factors on investor risk tolerance behavior.

To identify and analyze the effect of exogenous factors on investor risk tolerance behavior numerous variables, namely political– legal, technological, tax implications, macroeconomic factors (interest rates, exchange rates, inflation, GDP), international events and market fluctuations and volatility, were constructed. These constructs include self-structured questions derived from theory and findings identified by previous researchers (Grable, 2000; Yao et al., 2004; Rossini & Maree, 2005; Hanna & Lindamood, 2007; Guillemette & Finke, 2014; Chester, 2016; Schooley & Worden, 2016; Kuzniak & Grable, 2017; Mavee & Schimmel-Pfenning, 2017; Antelme, 2018; Woodyard & Grable, 2018; Patel, 2019; Pettinger, 2021; Money Matters, 2023). EFA was conducted to identify the most

significant financial risk events relating to the external environment that are likely to influence investor risk tolerance behavior. All constructs delivered satisfactory results for factor analysis, with KMO indexes attaining the minimum value of 0.5, and the Bartlett's test of sphericity was statistically significant ($p = 0.000 < 0.05$) (Malhotra et al., 2017; Sarstedt & Mooi, 2019). All constructs had reliable Cronbach's alpha values above 0.65 (Pallant, 2020).

3.4. Model Specification and Justification

Structural equation modeling (SEM) was used to construct a model to profile the risk tolerance behavior of adventurous investors based on endogenous and exogenous factors. The use of SEM facilitated the

attainment of the primary objective in the research study based on its ability to test an existing theory of a phenomenon and to test the theoretical relationship between multiple variables (Hardy & Bryman, 2004). Given the large categorical dataset and the number of scaled variables, SEM was deemed the most suitable model to represent the data. SEM incorporated a combination of multiple statistical techniques, such as factor analysis and regression analysis, which allowed the researchers to observe and measure the multifaceted structural relationships between the dependent variable (risk tolerance behavior) and the independent variables (endogenous and exogenous factors).

Figure 2 displays the conceptual model for the SEM.

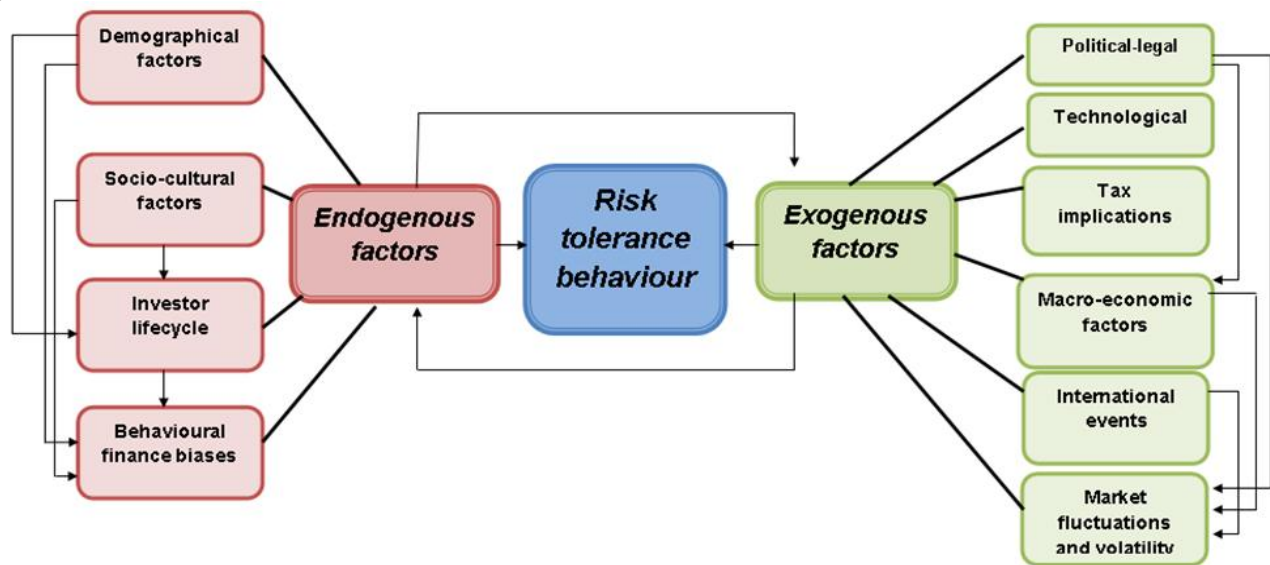


Figure 2. Conceptual model of investor risk tolerance behavior based on endogenous and exogenous factors (Developed by the authors)

Figure 2 illustrates the multifaceted relationship between the dependent variable (risk tolerance behavior) and the independent variables (endogenous and exogenous factors) to establish the influence of the pre-identified endogenous and exogenous factors on the risk tolerance behavior of adventurous investors. Statistical Packages of Social Sciences (IBM SPSS) version 26 and Amos were employed for preliminary data analysis and SEM. A sample size of 200 is adequate for multivariate normal data, whereas a sample size of 400 is adequate for non-normal data (Hox & Bechger, 1998; Weston & Gore, 2006). Considering that maximum likelihood estimation, which assumes multivariate normal data, was used to

estimate the model, the sample size of 463 investors was considered adequate to perform SEM with IBM SPSS Amos™, Version 26 (IBM SPSS Amos, 2020). Accordingly, SEM provided the researchers with the most advantageous statistical approach for the dataset and to attain the primary research objective.

The empirical results of the study are discussed in the following sections.

4. Empirical Results and Discussion

The standardized regression weight results for the specified structural model are shown in Table 2.

Table 2. Standardized regression weight results for the specified structural model (Developed by the authors)

Constructs	Estimates	P-value
Demographic factor		
← Age	-0.016	0.704
← Gender	0.108	0.011**
← Education	-0.062	0.145
← Annual income	0.091	0.053*
← Net worth	-0.117	0.006**
← Household size	-0.032	0.451
← Number of financial dependents	0.058	0.171
Socio-cultural factors		

Continuation of Table 2		
← Financial and investment knowledge	0.057	0.177
Investor life cycle		
← Growth investor phase	0.190	***
← Defensive (cautious) investor phase	0.177	0.003**
Behavioral finance biases		
← Representativeness	-0.005	0.898
← Overconfidence	0.181	***
← Anchoring	0.101	0.018**
← Gambler's fallacy	0.169	***
← Availability bias	-0.113	0.008**
← Loss aversion	-0.031	0.467
← Regret aversion	0.122	0.004**
← Mental accounting	0.020	0.633
← Self-control	-0.081	0.056*
Factors of the External Environment		
← Political-legal factors	0.160	0.111
← Technological factors	0.255	***
← Tax implications	-0.129	0.038**
← Interest rates	0.054	0.406
← Exchange rate volatility	0.159	0.044**
← Inflation	0.177	0.008**
← GDP	-0.589	***
← International events	-0.052	0.670
← Market Fluctuations and Volatility	0.281	0.033**

*** Significant at the 0.001 level

** Significant at the 0.05 level

* Significant at the 0.1 level

As shown in Table 2, demographical factors, namely gender (standardized regression coefficient = 0.108) and net worth (standardized regression coefficient = -0.117), contributed significantly towards explaining high-risk tolerance behavior at the $p < 0.05$ level, while annual income (standardized regression coefficient = 0.091) contributed significantly towards explaining high-risk tolerance behavior at the $p < 0.10$ level. The remaining demographical factors, namely age, education, household size, the number of financial dependents, and the socio-cultural factor, namely financial and investment knowledge, did not significantly contribute toward explaining high risk tolerance behavior ($p > 0.10$).

From the investor life cycle viewpoint, the growth investor phase (standardized regression coefficient = 0.190) contributed significantly toward explaining high risk tolerance behavior at the $p < 0.001$ level and the defensive (cautious) investor phase (standardized regression coefficient = 0.177) contributed significantly toward explaining high risk tolerance behavior at $p < 0.05$ level.

Looking at the behavioral finance biases, the overconfidence bias (standardized regression coefficient = 0.181) and the gambler's fallacy bias (standardized regression coefficient = 0.169) contributed significantly toward explaining high risk tolerance behavior at the $p < 0.001$ level. The anchoring bias (standardized regression coefficient = 0.101), availability bias (standardized regression coefficient = -0.113) and regret aversion bias (standardized regression coefficient =

0.122) contributed significantly toward explaining high risk tolerance behavior at $p < 0.05$ level. The self-control bias (standardized regression coefficient = -0.081) contributed significantly toward explaining high risk tolerance behavior at the $p < 0.10$ level. On the other hand, representativeness bias, loss aversion bias, and mental accounting bias did not significantly contribute toward explaining high risk tolerance behavior ($p > 0.10$).

Considering the factors relating to the external environment, technological factors (standardized regression coefficient = 0.255) and GDP (standardized regression coefficient = -0.589) contributed significantly toward explaining high risk tolerance behavior at the $p < 0.001$ level. Tax implications (standardized regression coefficient = -0.129), exchange rate volatility (standardized regression coefficient = 0.159), inflation (standardized regression coefficient = 0.177) and market fluctuations and volatility (standardized regression coefficient = 0.281) contributed significantly toward explaining high risk tolerance behavior at $p < 0.05$ level. Conversely, political-legal factors, interest rates, and international events did not significantly contribute toward explaining high risk tolerance behavior ($p > 0.10$).

These findings resulted in the following proposed model, as illustrated in Figure 3, to profile the risk tolerance behavior of adventurous investors based on the endogenous and exogenous factors that contributed significantly toward explaining high risk tolerance behavior.

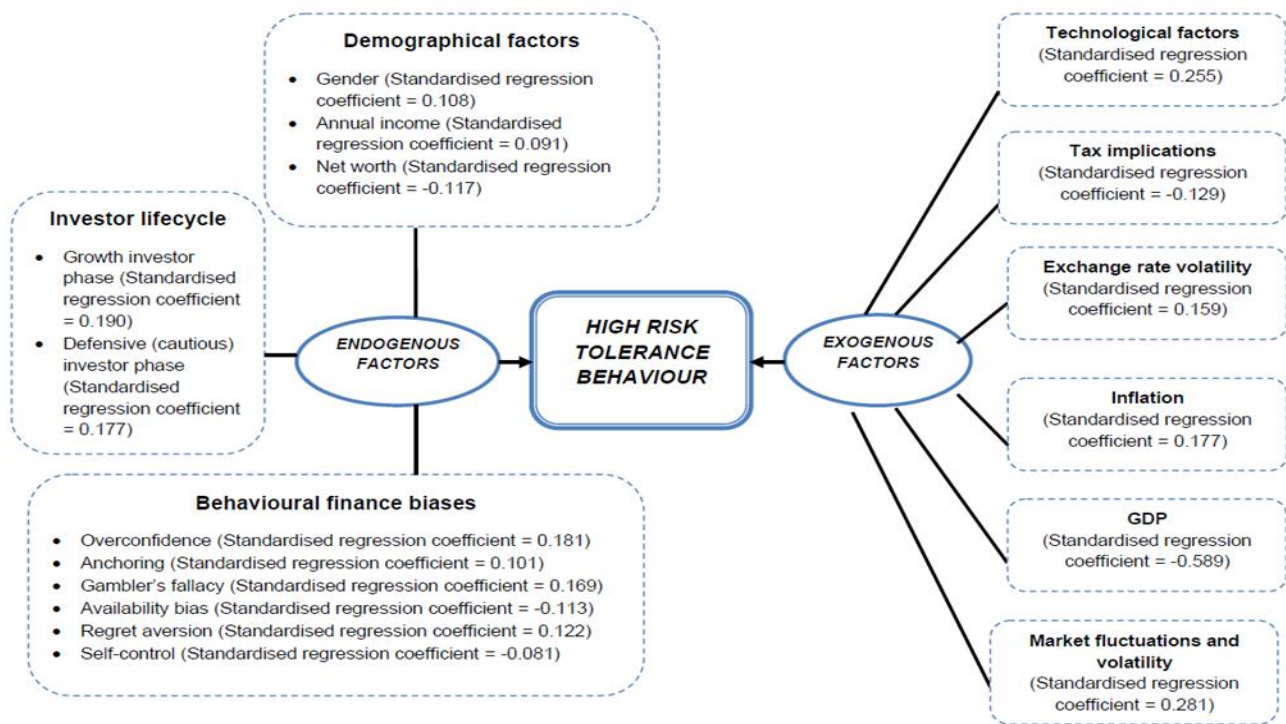


Figure 3. Proposed model to profile the risk tolerance behavior of adventurous investors based on endogenous and exogenous factors (Developed by the authors)

Looking at the endogenous factors, it can be concluded from Figure 3 that the demographical factor, namely net worth (standardized regression coefficient = -0.117), contributed the greatest degree toward explaining high risk tolerance behavior followed by gender (standardized regression coefficient = 0.108) and annual income (standardized regression coefficient = 0.091), respectively. The growth investor phase of the life cycle (standardized regression coefficient = 0.190) contributed the greatest degree toward explaining high-risk tolerance behavior whereas the defensive (cautious) investor phase of the life cycle (standardized regression coefficient = 0.177) explains high-risk tolerance behavior to a slightly lesser degree. In view of the behavioral finance biases, the overconfidence bias (standardized regression coefficient = 0.181) contributed the greatest degree towards explaining high risk tolerance behavior, followed by the gambler's fallacy bias (standardized regression coefficient = 0.169), the regret aversion bias (standardized regression coefficient = 0.122), the availability bias (standardized regression coefficient = -0.113), the anchoring bias (standardized regression coefficient = 0.101) and the self-control bias (standardized regression coefficient = -0.081), respectively.

Looking at the exogenous factors, which comprise factors of the external environment, it can be inferred from Figure 3 that GDP (standardized regression coefficient = -0.589) contributed the greatest degree towards explaining high risk tolerance behaviour, followed by market fluctuations and volatility (standardized regression coefficient = 0.281), technological factors (standardized regression

coefficient = 0.255), inflation (standardized regression coefficient = 0.177), exchange rate volatility (standardized regression coefficient = 0.159) and tax implications (standardized regression coefficient = -0.129), respectively.

Table 3 provides an overview of the endogenous and exogenous factors that uniquely contributed toward explaining high risk tolerance behavior and the degree to which each of these factors explains the risk tolerance behavior of adventurous investors.

Table 3. Proposed weights for profiling the risk-tolerance behavior of adventurous investors (Developed by the authors)

High risk tolerance behavior		
	Demographical factors	
	Gender	0.108
	Annual income	0.091
	Net worth	-0.117
	Investor life cycle	
	Overconfidence	0.181
	Anchoring	0.101
	Gambler's fallacy	0.169
	Availability bias	-0.113
	Regret aversion	0.122
	Self-control	-0.081
	Factors of the External Environment	
	Technological factors	0.255
	Tax implications	-0.129
	Exchange rate volatility	0.159
	Inflation	0.177
	GDP	-0.589
	Market fluctuations and volatility	0.281

Looking at the endogenous factors, it can be concluded from Table 3 that the demographical factor, namely net worth, contributed the greatest degree toward explaining high risk tolerance behavior followed

by gender and annual income. Various researchers have also found that net worth significantly contributes toward explaining high risk tolerance behavior (Sung & Hanna, 1996; Hallahan et al., 2003; Yao et al., 2004; Fan & Xiao, 2006; Al-Ajmi, 2008; Sages & Grable, 2010; Griesdorn et al., 2014; Mabalane, 2015; Sharma et al., 2017). International researchers, namely Cohn et al. (1975), Irwin (1993), Sung and Hanna (1996), Grable (2000), Yao et al. (2004), Sharma et al. (2017) and Shah et al. (2020), and South African researchers, namely Van Schalkwyk (2012), Mabalane (2015), Dickason (2017) and Van den Bergh (2018), found gender and annual income to significantly contribute toward explaining high risk tolerance behavior.

The growth investor phase of the life cycle contributed the greatest degree to explaining high-risk tolerance behavior. The defensive (cautious) investor phase of the life cycle explains high risk tolerance behavior to a slightly lesser degree. This finding agrees with the investor life cycle theory as adventurous investors with high risk tolerance behavior are in the growth investor phase of the life cycle (Hanna & Chen, 1997; Sheldon, 2018).

Concerning behavioral finance biases, the overconfidence bias contributed the greatest degree toward explaining high risk tolerance behavior, followed by gambler's fallacy bias, regret aversion bias, availability bias, anchoring bias, and self-control bias, respectively. Compared to these findings, Pompian (2016) found that adventurous investors with high risk tolerance behavior are subject to biases such as overconfidence, availability and self-control. Dickason and Ferreira (2018a) found that adventurous investors with high risk tolerance behavior are subject to self-control bias. These endogenous factors that uniquely contributed toward explaining the risk tolerance behavior of adventurous investors explain high risk tolerance behavior to a rather small degree.

Looking at the exogenous factors, which include factors of the external environment, it can be summarized from Table 3 that GDP explains high risk tolerance behavior to a large degree. GDP contributed the greatest degree toward explaining high risk tolerance behavior followed by market fluctuations and volatility, technological factors, inflation, exchange rate volatility and tax implications, respectively. These exogenous factors that uniquely contributed toward explaining the risk tolerance behavior of adventurous investors explain high risk tolerance behavior from a rather small to a large degree.

Very little research has been conducted to identify and analyze the influence of exogenous factors on the risk tolerance behavior of adventurous investors. Nonetheless, Kuzniak and Grable (2017) studied the relationship between investor risk tolerance behavior and a country's GDP and found that investors who live in countries with a high GDP are more risk adventurous

than investors living in countries with a lower GDP. Brandt and Wang (2003) established that investors are more risk adventurous with greater propensities to take high risk during periods of economic growth and less risk adventurous during periods of economic recessions. Researchers, namely Sung and Hanna (1996), DeVaney and Su (1997), Grable and Lytton (1997), and Grable (2000), found that investors with greater and positive economic expectations are more risk adventurous than investors with lower and negative economic expectations.

The risk tolerance behavior of investors is also likely to change in the reaction to market returns. It has been found that investors are probably more risk adventurous when financial markets increase and less risk adventurous when financial markets decrease (MacKillop, 2003; Yao *et al.*, 2004; Pan & Statman, 2010; Yao & Curl, 2011). Malmendier and Nagel (2011) also established that the risk tolerance behavior of investors is affected by macroeconomic shocks experienced during their life cycle. Investors who experienced a stock market boom during their life cycle were more risk adventurous than those who did not experience a stock market boom. Moreover, investors who encountered a constant bull market had a greater propensity to hold shares and a larger portion of wealth in the form of shares.

In conclusion, the endogenous and exogenous factors that contributed the greatest degree toward explaining the high-risk tolerance behavior of adventurous investors should be considered. However, the endogenous and exogenous factors that explain high risk tolerance behavior to a relatively small degree, given the complexity of the SEM, should not be disregarded as they also uniquely contribute toward explaining the risk tolerance behavior of adventurous investors.

The conclusion of the research study is presented in the following section with an overview of the contribution this study makes to the research field and financial industry and acknowledging the limitations of this study to make recommendations and contribute toward opportunities for future researchers.

5. Conclusion

Investing goes beyond financial figures and investment returns. Financial environments are becoming increasingly complex, paired with decisions involving greater risks. Investors not usually keen to take on higher risks are urged to be more adventurous in their risk-taking behaviors to achieve desired investment outcomes. The willingness and decision-making of adventurous investors to engage in risky behaviors are influenced by several endogenous and exogenous factors. Investors and financial practitioners should understand the factors that influence investors' risk-taking behaviors to help them navigate the

complexities of the financial environment, especially in South Africa. This will lead to successful investment experiences and have a positive impact on the financial well-being of investors.

Several studies have examined the factors that influence the risk tolerance behavior of investors when making investment decisions. However, no studies have examined the influence of several both endogenous and exogenous factors on the risk tolerance behavior of adventurous investors. Previous studies have also not concentrated on and addressed the shortcomings of existing and conventional risk assessment forms used by financial practitioners. Therefore, the primary objective of this research article was to construct a model to profile the risk tolerance behavior of adventurous South African investors based on endogenous and exogenous factors.

The primary objective was achieved through the development of a risk profiling model using SEM. Numerous pre-identified endogenous and exogenous factors significantly and uniquely contributed to explaining the high-risk tolerance behavior of adventurous investors. This resulted in the effective development of a model to profile the risk tolerance behavior of adventurous investors based on endogenous and exogenous factors. The degree to which each of these factors explains the high-risk tolerance behavior of adventurous investors should also be considered.

This risk profiling model makes a notable and exclusive contribution to the field of study and the financial industry. It is multifaceted and sophisticated as it incorporates several pre-identified endogenous and exogenous factors into the model to profile risk adventurous South African investors. It enables investors to make informed investment decisions in line with their investment goals and objectives. Consequently, financial practitioners can profile the risk tolerance behavior of adventurous investors more accurately in a complex financial environment.

This risk profiling model should be considered by investors, financial practitioners, and researchers within South Africa and internationally to understand the endogenous and exogenous factors that influence the risk tolerance behavior of adventurous investors. It will assist in the identification of the endogenous factors unique to adventurous investors that influence their risk tolerance behavior. It will assist with the identification of the exogenous factors relating to the external environment that may influence the abilities of adventurous investors to take more risks given the South African and worldwide economic climate and financial market conditions. Overall, it should be considered to facilitate the more practical and accurate profiling of the risk tolerance behavior of adventurous investors to ensure successful investment experiences. This study also contributes significantly to academia and the financial industry by attending to worldwide deliberations regarding the shortcomings of existing

and conventional risk assessment forms.

As with any study, there are certain limitations within the research article that provide future researchers with new opportunities. As a non-probability purposive sampling method was used to obtain a representative sample from a specific investment company in Gauteng, South Africa, a different sampling method can be used. The inclusion criteria of the study can be amended as preferred by the researcher to draw a representative sample from the population. Reviewing and further investigating the pre-identified endogenous and exogenous factors incorporated into the model to profile the risk tolerance behavior of adventurous investors will assist in refinement and simplifying the multifaceted risk profiling model.

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